TENDER SCHEDULE

TENDER NO: 2/2015

INVITATION OF BIDS FOR SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQM) AT PERUNDURAI, TAMILNADU.

SECTION – I

INVITATION FOR BIDS

1. **Sealed Tenders will be received till 1.00 PM on** 01.06.2015 by the **Chairman,** or any other official authorized by the Chairman, Tamilnadu Pollution Control Board, Chennai for the **SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQMS) one number** as per the list given in annexure-I and as per the technical specifications given in annexure-III.
2. The Scope of Works under the package shall include:

   A) The supply, installation, testing and commissioning of equipment and provision of training of TNPCB officials station wise.

   B) Operation & Maintenance of Air Monitoring Stations for a period of five (5) years from the date of commissioning of the station, which can be extended up to three (3) years at the mutually agreed rates and terms and conditions.

   C) Data & Report of data pertaining to CAAQMS to TNPCB/CPCB.

   D) On line transfer of data to TNPCB & CPCB.

   E) **Location where CAAQMS to be installed:**

      i. Perundurai, Tamilnadu

3. Interested eligible bidders may obtain further information from the office of the Deputy Director (Labs)-Air at Advanced Environmental Laboratory, Tamilnadu Pollution Control Board (Annexe Building), 76, Mount Salai, Guindy, and Chennai-32.
4. The bidder should be the manufacturer of the item quoted or his authorized agent who have supplied, tested and commissioned any where in India which should be in satisfactory operation with no adverse report as on date of bid opening and should have adequate experience in O & M of AAQS with adequate personnel. The Terms & Conditions of O & M to be satisfied are laid out in Section V.

5. The tender documents have been published in the website **www.tenders.tn.gov.in and www.tnpcb.gov.in.** They can be downloaded. A complete set of bidding documents may also be purchased by any interested eligible bidder on submission of a written application to the above office along with a **Demand Draft drawn in favour of "Tamilnadu Pollution Control Board, Chennai,"** obtained from any one of the Nationalised Banks towards the cost of the tender document.
6. Each tender schedule should be used for quoting one model of the instrument only. If the tenderer is willing to quote for more than one model, separate tender schedule should be obtained for each model and quoted in separate covers following the tender procedures laid down in the tender schedule.
7. The bidding document may be obtained from the office of the Deputy Director (Labs)-Air, Advanced Environmental Laboratory, Tamilnadu Pollution Control Board (Annexe Building), 76, Mount Salai, Guindy, Chennai-32 during office hours from **10.00**A.M. To **3.45** P.M. on all working days either in person or by posts.
8.

a)	Cost of bidding document(Non-refundable) i) by down load	:Rs. 1,000/-
		Downloaded tender documents from the website should accompany a Demand Draft / Banker Cheque for Rs. 1000/- towards tender documents charges drawn in favour of "TNPCB, Chennai" from any one of the Nationalised bank.
	ii) to obtain by post	: Rs.1, 100/-(inclusive of postage charges of Rs.100/-).
b)	Date of commencement of sale of bidding document publishing in the website	: 24.04.2015
c)	Date of Pre-Bid Conference	: 14.05.2015 at 11.30AM
d)	Last date for sale of bidding document	: 01.06.2015 **up to 12.00 Noon**
e)	Last date and time for receipt of bids	: 01.06.2015 up to 1.00 PM
f)	**Date and Time of opening of bids**	
	Cover – A (Technical Bid)	: 01.06.2015 at 3.00PM
	Cover – B (Price Bid)	: Date will be intimated separately.

g)	Place of opening of bids	:Tamilnadu Pollution Control Board, 76, Mount Salai, Guindy ,Chennai-32
h)	Address for communication	All sealed tenders should be addressed to the Chairman, TNPCB, Chennai-32 and deposited in the Tender Box in the office of Deputy Director (Labs)-Air, Advanced Environmental Laboratory, Tamilnadu Pollution Control Board(Annexe), 76, Mount Salai, Guindy, Chennai-32 (or) sent by post to the Deputy Director(Labs)-Air TNPC Board (Annexe), 76, Mount Salai, Guindy, Chennai-32.

9. All bids must be accompanied by EMD as specified in the bid documents and must be delivered to the above office at the date and time indicated above.
10. Bid will be opened in the presence of the bidders or their authorized representatives who are willing to attend on the specified date and time.

ANNEXURE-I

The equipments required for one Continuous Ambient Air Quality Monitoring Station.

The systems should be complete in functional. Material which are not specified in the specification but required to be felt as supporting/essential as per the norms and purpose must be supplied by the vendor.

Schedule No.	Brief Description	Qty. in nos.
1	Continuous Automatic Air Quality Monitors analyzers for CO, SO_2, NO_2+NH_3, O_3, and Beta Gauge $PM_{2.5}$ and PM_{10} Monitors.	1 unit each
2.	BTX Monitor/ Analyser	1 Unit
3.	Multi-calibration system for gaseous monitors comprising of gas supply / generation and automated calibration	1 Unit
4.	Meteorological Instrumentation comprising Wind direction, Wind speed, Vertical wind speed, Ambient temperature, Relative humidity, Solar Radiation, Barometric Pressure and Rainfall mounted on telescoping crank up meteorological Mast.	1 Set
5.	DAS system consisting of one PC along with Laser Printer at the monitoring station and one PC at central office with peripherals and software for data acquisition / Data display Board / transfer and system integration, telephone, Modem.	1 Lot
6.	Modem	2 Units
7.	Data display system	1 Unit
8.	Sampling line, Internal fitting, Instruments racks Electrical and Gas line fittings, Tools (electrical and mechanical) and furnitures.	1 Unit
9.	UPS, 10 KVA (2hr. full load back-up)	1 Unit
10.	UPS, 5 KVA (2hrs. full load back-up)	1 Unit
11.	Split Air Conditioner (2 Ton capacity)	2 Nos.

SECTION - II

CONDITIONS OF TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQMS)

(To be enclosed in Cover - A)

TAMILNADU POLLUTION CONTROL BOARD

SECTION – II

CONDITIONS OF TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQMS)

Sealed tenders are invited by the Chairman, Tamilnadu Pollution Control Board, Chennai for **supply, installation, commissioning and operation & maintenance services for continuous ambient air quality monitoring stations (CAAQMS).**

1. The actual manufacturers or their authorized agent should only quote. Subletting and assigning of contracts to any other firm/ person is prohibited except with the prior permission of the Chairman, Tamilnadu Pollution Control Board, Chennai-32 or an officer authorized on behalf of the Chairman.
2. **Tender should be enclosed in a sealed envelope super scribed with tender number, the name of the item for which quoted and the due date of the tender and sent to the** Deputy Director(Labs)–Air, Tamilnadu Pollution Control Board, (Annexe Building), 76, Mount Salai, Guindy, Chennai-32 so as to reach on or before 01.06.2015 1.00PM**.** The tender (Covers A & B) received without superscription as above and received late will be rejected.
3. a. Tender will not be accepted, if TNGST NUMBER and CST NUMBER of supplier is not indicated in the offer.
   b. Telegraphic, Telex or Fax or open letter offers will not be accepted.
   c. Each tender has two parts viz., Technical bid and Price bid. Technical bid in Cover-A and Price bid in Cover-B should be separately sealed and sent along with Technical bid.

5. **Technical Bid in COVER – A**

The following documents and certificates should be enclosed in Cover-A along with the Technical bid.

I- **Check List – A:** Check List **"A**" along with details called for therein**.**

II - Checklist B - for O & M as per section V.

1. Attachment in support of meeting qualifying requirement for carrying out O & M as per attachment O & M 1 & 2.
2. Confirmation to the capability to furnish the information report format (A,B,C,D, E& F)
3. Terms & Conditions for O&M duly signed (Section V)
4. Check list to compare Firm's Technical capability for specification of Software as prescribed in Table-1 in Page 51.

The above documents should be submitted in "Cover**-A"**, addressed to the Chairman, Tamilnadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032 and super scribed as **TENDER NO. 2 /2015, DUE DATE ON 01.06.2015 AT 1.00 PM. TECHNICAL BID FOR "supply, installation, commissioning and operation & maintenance services for continuous ambient air quality monitoring stations (CAAQMS)-1 Number".**

5.1. **Price Bid in COVER - B**

The following documents should be enclosed along with the PRICE BID IN COVER-B

III - Checklist- C

1. Summary of price bid (Attachment 10)
2. Bid price break up for equipment (Attachment 11)
3. Bid price break up for O & M for 5 years (Attachment 12 & 13)
4. Annual Report and Balance Sheet for the last 2 years
5. Annexure –IV duly signed (page 97)

NOTE:

1) The price for inland items tendered should be in Rupee and should include all taxes and for free delivery to the places noted in the schedule. If any taxes are chargeable extra, the rate of taxes should be specified. Sales tax declaration form, if any, required should be specifically mentioned with time limit for furnishing such declaration.

2) If the items quoted are to be supplied by import, the quotation should be furnished in foreign currency indicating cost, insurance, freight charges along with value in Rupees (the current conversion rate should also be furnished) etc.,. The Board is eligible for custom duty concession.

3) Rates should not be altered. Quotations shall always be both in figures and words.

4) The prices should be firm and should not be subject to any variation clauses.

5) The Board is not eligible for 'C' (or) 'D' Form.

6) To convert tender prices in INR, the exchange rate on the date of opening Price bid in Cover 'B' will be taken.

The **"Cover B"** should also be addressed to the Chairman,

Tamilnadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032 and super scribed as **PRICE BID FOR THE "supply, installation, commissioning and operation & maintenance services for continuous ambient air quality monitoring stations (CAAQMS)-1 Number". Tender No.2/2015, Due date on 01.06.2015** at **1.00P.M.**

5.2. Both **Covers A & B** should reach this office on or before **1.00 P.M on 01.06.2015.**

Technical Bid in Cover-A will be opened at Tamilnadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai – 32 **at 3.00 P.M**. **on 01.06.2015** in the presence of the tenderers/senior responsible officers of the companies who choose to be present. **Price Bid** in **Cover B** of those companies which satisfy the tender conditions and technical specifications of the Board will alone be opened at a later date. The date of opening of price bid will be intimated separately.

5.3. Each page of the tender should be authorized by the tenderer.

6.0 **The tenderer shall submit check list-A & check list – B in Cover A and check list-C in Cover-B with page numbers of the document enclosed.**

6.1 The successful tender shall provide the service manual including the circuit diagram of the instruments offered along with the supply of the CAAQM instruments.

7. It shall be the responsibility of the tenderer for any shortages/damages at the time of receipt of the tender.

8. All columns of the tender form should be duly, properly and exhaustively filled in. The signature on the quotations shall be deemed to be of the authorized signatory. The words 'NOT QUOTED" should be written against any or all the items in the schedule for which a Tenderer does not wish to tender, conditional offers and counter offers are liable to be ignored and/or rejected.

9. Corrections in the Tender shall be authenticated by the Tenderer.

9.1 **Clarification of Bidding Documents**

(1) If a prospective Bidder has any doubt as to the meaning of any part of the Bidding Documents he may notify the Tamilnadu Pollution Control Board for supplementary information and explanation in writing in the format given in the Attachment-(2), at the following address at least three (3) days prior to the date set for pre-bid conference.

Deputy Director (Labs)-Air,

TNPC Board
No 76, Mount salai,
Guindy, Chennai-32

(2) Pre-Bid Conference

The bidder or his authorized representative is invited to attend the pre-bid conference the date and time of pre bid conference will be held on 14.05.2015 at 11.30 AM. During the meeting the following subjects may be discussed.

a) The purpose of the conference will be to clarify any issues regarding the Bidding Document.

b) The bidder is required to submit questions in writing to reach the Deputy Director (Labs)-Air, not later than two days prior to the pre-bid conference.

c) **Any modification of the Bidding Document which may become necessary as a result of the pre-bid conference shall be made by the Officer authorized by the TNPC Board exclusively through an addendum to the bidding documents and not through the record notes of the pre-bid conference.**

d) Non-attendance of the pre-bid conference will not be a cause for disqualification of a bidder.

e) The bidder shall depute maximum two authorized persons to take part in pre-bid conference.

f) The bidder is not expected to raise any additional query after pre-bid conference and the TNPC Board is not obliged to reply any such queries.

g) The pre-bid conference shall be open to those intending bidders who have purchased / downloaded the Bid Documents.

9.2. **Amendment of Bidding Documents**

(1) At any time prior to the deadline for submission of the Bid, the Board, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the Bidding Documents by amendment.

(2) All prospective Bidders who have received the Bidding Documents will be notified of the amendment in writing at the address contained in their letter of request for issue of bidding documents and will be binding on them. The amendments will also be published in the website **www.tenders.tn.gov.in and www.tnpcb.gov.in.** It is the responsibility of the tenderers to notice any subsequent amendment issued in this regard. The TNPC Board will bear no responsibility or liability arising out of non-receipt of the same in time or

otherwise.

(3) In order to allow prospective Bidders reasonable time in which to take amendment into account in preparing their Bids, the Board at its discretion may extend the deadline for submission of the Bid.

10. **GUARANTEE**: The supplier or the Indian representative should give the performance warrantee for the complete system for 5 years from the date of satisfactory installation and service back up including **commitment for the availability of spares of the system for a minimum period of 10 years** from the date of installation. Also in the case of the instrument/ equipment going out of production, at least 2 years advance notice should be given to enable one time procurement of spares. The contractor must take into account the manufacture's statement.
11. **DELIVERY**: Supply should be strictly made as per delivery schedule issued with the purchase order. All supplies are to be completed within the time specified in the purchase order, failing which Tamilnadu Pollution Control Board reserves the right to cancel or modify orders if it is seen that the progress of the supplies are not satisfactory.
12. The Chairman, Tamilnadu Pollution Control Board, reserves the right of accepting or rejecting all or any of the tenders without assigning any reasons thereof for the same and or to split up the tender as it may deem fit and/or also to finalise the tender after negotiations and also increase or decrease the tendered quantity. Repeat orders will also be placed on them after watching the performance if considered necessary.
13. The tenderers must state, while sending their tenders, that they understand and accept this tender enquiry conditions and without such acceptance, the tender will not be considered.
14. The tenderers should mention the brand and the manufacturer's details in the tender.
15. The tenderer shall arrange for security for protecting the item from loss or damage during transit. In case of damages, the tenderer should replace the damages during transit by good ones and at destination without any extra cost.
16. The quantity indicated in the schedule is only approximate and will not be, in any manner, what so ever, binding on Tamilnadu Pollution Control Board.
17. Goods not conforming to specification and found to be defective or damaged in transit will be returned by the Board. The replacement should be made within a

reasonable time on receipt of rejected goods.

18. Any other conditions which might have been quoted by the seller and in contravention to the terms prescribed in the tender instruction will not be accepted.
19. The conditions mentioned herein will form part and parcel of the agreement.
20. The tender schedule should be filled in without any omission or otherwise the offer will be liable for rejection.
21. The tenderer should be prepared to come for a negotiation in this office at a short notice if called for by the Board.
22. The supplying firms should clearly understand that time is the essence of the contract and no extension of time for the delivery will be entertained, under any circumstances. Therefore, the delivery of the goods specified in the purchase order should be made within the time limit prescribed. Where the tenderer supplies or despatches the items beyond the delivery period, specified in the Purchase Order, the Board will have no obligation to accept the goods. If accepted, Board has the right to recover pre-estimated liquidated damages at the rate of 10% p.a. of the value of goods delayed for each day to the delay thereof, without prejudice to any other relief or compensation due to the purchase order or under any other conditions of the contract. The delivery that can be offered from ready stock should be noted for each item in the schedule.
23. All disputes are subjected to the jurisdiction of court in Chennai City only.
24. Tamilnadu Pollution Control Board will not accept any responsibility for any postal delay involved in the transmission and receipt of tender documents.
25. It is also requested to furnish whether any service center is available for the above in Chennai City and other places in Tamilnadu and India.
26. **EARNEST MONEY DEPOSIT:** Each tender must be accompanied by a deposit amount of Rs.2,00,000 (Rupees two lakhs only) as Earnest Money Deposit. The Earnest Money Deposit must be furnished in the form of Demand Draft drawn in favour of the “Tamilnadu Pollution Control Board, Chennai” and the same should be sent along with the tender in Cover-A. **EMD in any other form will not be accepted**. (If exemption is requested (**only for supply of indigenous items**) for the payment of EMD and SD in case of NSIC/SSI units, a performance security deposit of 5% will be retained by the Board and will be returned after one year from the date of completion of installation and satisfactory demonstration.)

    Tenders not accompanied by the Earnest Money Deposit will be rejected.

Earnest Money Deposit will be returned to unsuccessful tenderers after finalisation of the tender. On no account the security deposit of a previous contract can be taken as an authority for the tender or a tender accepted without the Earnest Money Deposit. It is important that all Earnest Money Deposits are made by way of Demand Draft in favour of the "Tamilnadu Pollution Control Board, Chennai". No exemption will be permitted.

27. **VALIDITY**

The rates quoted shall be valid for a minimum period of **180 days from the date of opening of the Price bid of the Tender.**

In exceptional circumstances, the Board may in writing or by facsimile, solicit the Bidder's consent to an extension of the period of the Bid validity. If the Bidder agrees to the request for extension, the Bid Security shall also be extended for an equivalent period of time.

Any Bidder may refuse to extend the validity of his Bid without forfeiting his Bid Security, but the Bid will not be considered.

Bidders granting the requests for extension of the Bid validity will not be required or permitted to modify their Bids.

28. **SECURITY DEPOSIT:**

Security Deposit equivalent to 5% of the value of the supply order should be furnished in the firm of Demand Draft drawn in favour of Tamilnadu Pollution Control Board, Chennai, within 7 days from the date of receipt of the supply order. Security deposit in any other form will not be accepted.

29. In the case of successful tenderer, the Earnest Money Deposit may, at the discretion of Chairman, Tamilnadu Pollution Control Board, Chennai be adjusted towards the Security Deposit payable by him and the balance to be paid by the tenderer so as to form 5% of the value of supply order as Security Deposit, will be intimated.

30. AGREEMENT:

The successful tenderer shall execute an Agreement on a 20/- Rupee non-judicial stamp paper with the Chairman, Tamilnadu Pollution Control Board, Chennai within 15 days from the date of the receipt of the supply order. The specimen form of the agreement will be supplied by Tamilnadu Pollution Control Board.

31. The Security Deposit remitted by the successful tenderer will be returned only after completion of warranty period and upon complete fulfillment of the tender to the entire satisfaction of the Chairman, Tamilnadu Pollution Control Board.

32. **The Declaration Form in Annexure-II** must be signed by the tenderer and must

be enclosed along with the tender. Tenders received without the declaration form shall not be considered.

33. The acceptance / non acceptance of tender shall be communicated to the tenderers in writing.

34. If the items quoted are to be imported, the successful tenderer shall co-ordinate with TNPCB in the clearance of the item from customs authority, whenever necessary.

35. PENALTY CLAUSES

If the successful tenderer fails to execute the said Agreement and/or fails to remit the required security within the time specified or withdraws his tender after the intimation of the acceptance of his tender or owing to any other reasons, he is unable to undertake the contract, his contract will be cancelled and the Earnest Money Deposit made by him along with his tender shall stand forfeited to the Tamilnadu Pollution Control Board and he will also be liable for all damages sustained by Chairman, Tamilnadu Pollution Control Board by reasons of such breach including the liability to pay any differences between the prices accepted by him and those ultimately paid for the services concerned. The damages assessed by the Chairman, Tamilnadu Pollution Control Board will be final in this matter.

36. **TRAINING**

The suppliers at their expenses should provide free training, for a minimum of two persons in the operation and maintenance of the entire system at vendor's cost at the installation site or at the suitable place including data management and quality checks as specified in condition 11 of the Operation and Maintenance contract for the Equipment.

The Contractor shall furnish the schedule and program of the training to the Board within 30 days after the notification of award in such a manner that proper training is imparted to Board staff members.

SECTION - III

GENERAL CONDITIONS & SPECIAL CONDITIONS OF CONTRACT

A- GENERAL CONDITIONS OF CONTRACT

1. **LOCATION**

The final designated HQ/Zones of each equipment to be delivered by the Contractor will be specified in supply order.

2. **Language**

All documents and correspondence related to the Contract shall be made in English.

3. **Site Condition**

The Contractor shall study the existing Site conditions, referring to the Bidding Documents carefully in order to familiarize themselves with the works. The Contractor should ascertain all particulars of the location and Site conditions at their own expense.

4. **Specification of Equipment**

The performance, materials, duty, workmanship, operating conditions and design conditions for the Equipment shall meet and comply with the Specifications. The Specification indicates the principal and minimum technical requirements for each equipment. The details of the Equipment shall be fully examined and suitably selected through the detailed engineering and design without sacrifice in quality or serviceability of the Equipment. The figures of dimension and weight shown in the Specifications are indicatively presented as approximate figures. These figures may not necessarily and exactly be applied for the selection of the Equipment, but the Contractors shall meet the principal and minimum requirements shown in the Specifications. Any Bidder offering better specification than the minimum prescribed shall be considered as technically qualified.

5. **CODE AND STANDARD**

All the Equipment and the Works shall conform to the approved and authorized codes and standards of the origin country, the following standards wherever applicable and Indian Standard which are in force at the moment of the installation.

- Japanese Industrial Standard (JIS)
- Environmental Protection Agency of United States (U.S. EPA) Standard
- International Organization for Standard (ISO)
- British Standard (BS)

Other internationally prevailing standards are accepted for the Equipment, unless otherwise indicated.

Even if some codes and standards are designated in the Specifications, the other codes and standards not shown therein are also applicable instead of the designated ones as far as they are equivalent to such designated codes and standards and meet the requirement thereof.

6. ELECTRICAL RATINGS

The Equipment shall conform to the following ratings and standards wherever applicable.

1) All the electrically operated equipment specified herein shall be single phase, AC 220 V $\pm$ 10 % and 50 Hz, unless otherwise specified in the Specifications.

2) Electrical plugs for the Equipment shall conform to local regulations and standards.

7. Precaution against Voltage Fluctuation

Adequate automatic voltage regulator for the Equipment shall be arranged by the Contractor wherever indicated in the Specifications. The Contractor shall pay due attention to that electrical voltage fluctuation exerts a serious influence and damage upon functioning of the Equipment.

8. **PROTECTION AND SAFETY**

The Contractor shall be totally responsible for all the reasonable precautions against fire in respect of the Works, temporary works, offices, storage yards and other places and things connected therewith. The Contractor shall comply with all rules and regulations and orders which have been made by the Government of India, the Board or any other competent authority and the contractor shall provide sufficient fire-fighting protection in respect of the safety of the property and personnel of the Board.

9. **WORKS SCHEDULE**

The Contractor shall complete the Works in accordance with the “Work Schedule” in the tender.

10. **PROJECT FORMATION**

The authorized personnel of the Board for the Project who is responsible for any coordination with the Contractor is

Deputy Director (Labs)-Air
Tamilnadu Pollution
Control Board,
76, Mount Salai,
Guindy,
Chennai - 600032.

Any correspondence to or authorization from the Board shall be made with the officers mentioned above.

11. WARRANTY / O&M CONTRACT

The CAAQMS shall be under O&M Contract from the date of commissioning of the CAAQMS. However the Contractor shall warrant to the Board that the Equipment to be supplied under the Contract is new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. This warranty includes all spare parts and services to keep the instruments and equipment in operating condition. In case O & M is not awarded / terminated the equipment shall remain warranted for 3 years. The Contractor shall further warrant to the Board that the Equipment complies strictly with the Specifications and has no defect, arising from design, materials, or workmanship or from any act or omission of the Contractor that may develop under normal use of the supplied Equipment in the conditions prevailing to the final Sites.

12**. Period of O&M Contract**

This O&M Contract shall remain operative for the period specified in Special Conditions of Contract (SCC) after the successful installation & commissioning of the stations by the Contractor.

13**. Manufacturer's Warranty**

The contractor must take into account the manufacture's standard Warranty on the equipment supplied **before quoting for O&M cost for the years** for which such Warranty is applicable.

14. **Insurance**

The Equipment supplied under the Contract shall be fully insured (Comprehensive) in currency acceptable as per the existing Law of India against loss or damage incidental to manufacture or acquisition, transportation, storage, shipment, delivery, installation and training involved with the Works naming the Board as the beneficiary, in the manner specified in the SCC, until issuance of taking over certificate.

15. **Training**

The Contractor shall provide the Board staff training as specified for the Equipment & Technical Specification at their cost.

The Contractor shall furnish the schedule and program of the training to the Board within 30 days after the notification of award in such a manner that proper training is imparted to Board staff members.

B - SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict the provisions herein shall prevail over those in the General Conditions of Contract the corresponding clause number of the GCC is indicated in parentheses, if applicable

1. CLIMATE CONDITION

Precaution and protection against the specific climate conditions in India such as heavy rain, high temperature, high humidity, gales, excessive sunshine, flooding or any other climate conditions which could cause damage upon the Equipment or otherwise interfere with the execution of the works shall be taken. The Equipment to be supplied shall be tropicalized.

2. CONSUMABLES AND SPARE PARTS

Supply of Consumables and Spare Parts

The Contractor shall provide the consumables and spare parts as per requirement of Operation Maintenance of CAAQM Station.

3. After Sales Services

The Contractor shall guarantee the availability of all consumables, spare parts, maintenance and repair work for each Equipment at cost basis for at least ten (10) years after the O&M period, unless otherwise specified in the Specifications.

Bidder should submit certificates from the manufacturers in support of available service centres and availability of spares parts and consumable in India as per Attachment no. 5.

4. NAME PLATE

The Contractor shall affix the name plate with the following description in English on all the Equipment:

1) Name of the station
2) Name of the Equipment
3) Manufacturing date
4) Production serial number
5) Equipment model number
6) Name of manufacturer
7) Ratings of the Equipment

8) Logo of TNPCB and CPCB

5. MARKING

The Contractor shall mark the following information in the sequence described below and in a frame commensurate with the size of packing and/or the Equipment.

1) Consignee: (Name of the Board & Address), India

2) Name of the Works. Supply and O&M of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) for TNPCB at Perundurai, Tamilnadu.

3) Name of the Project: Supply and O&M of Continuous Ambient Air Quality Monitoring Station (CAAQMS) for TNPCB at Perundurai, Tamilnadu.

4) Contract number:

5) Contractors name:

6) Port or airport of discharge:

7) Country of origin:

8) Item, and if applicable, package number in sequence, and quantity per package and/or Equipment:

9) Description of Equipment:

10) Net and gross weight and cubic measurement:

11) Shipper's name and/or marks:

12) Caution marks, if applicable:

13) Other markings required by the Board:

6. SHIPMENT

The Contractor shall be responsible for the delivery of the Equipment to each Site designated by the Board and for the coverage of shipping charges, freight, insurance premiums up to handling over the Equipment at Sites, inland transportation and temporary storage.

6.1 Notification and Submission of Documents

Upon shipment, the Contractor shall notify the Board and the Insurance Company by cable of the following details of the shipment.

1) Contract number

2) Description and quantity of the Equipment

3) Name of vessel and air cargo

4) Number and date of bill of lading and airway bill

5) Date of shipment, port of discharge, expected date of departure and expected date of arrival

6) Invoice amount of shipment

7) Name of a claim settling agency in India.

6.2 The Contractor shall mail the following documents to the Board, with a copy to the Insurance Company.

(1) **Equipment of Foreign Origin:**

i) Four (4) Copies of the contractor's invoice showing the Equipment's description, quantity, unit price and total amount

ii) Original and Four (4) co[pies of the negotiable, clean, on-board bill of lading marked freight prepaid and four copies of non-negotiable bill of lading;

iii) Four copies of the packing list identifying contents of each package

iv) Insurance certificate

v) Manufacturer and Suppliers warranty certificate

vi) Factory test and inspection certificate

vii) Certificate of country-of origin

The above documents shall be received by the Board at least one week before arrival of the Equipment at the port or place of arrival and. If not received, the Contractor will be responsible for any consequent expenses.

Partial shipment and transshipment is allowed.

(2) **Equipment to be Supplied from within India:**

Upon delivery of the Equipment to the transporters, the Supplier shall notify the Board and mail the following documents to the Board.

i) Four copies of the Supplier's invoice showing the Equipment's description, quantity, unit price and total amount

ii) Acknowledgement of receipts of goods from the consignee i.e. receipted delivery note, railway receipt (RR), or truck receipt (LR)

iii) Supplier's and/or Manufacturer's warranty certificate

iv) Factory test & inspection certificate and Material Dispatch Clearance Certificate (MDCC) issued by the Board.

v) Insurance certificate

vi) Certificate of country of origin

The above documents shall be received by the Board before arrival of

the Equipment and, if not received, the Supplier shall be responsible for any consequent expenses.

7. **WORKS SCHEDULE**

Equipment to be supplied from Foreign Country:

Delivery Period for all the packages shall be **90 days from the date of the opening of Letter of Credit (L/C)**. It relates to completion of delivery on CIF (designated Sea Port / Air Port) basis for equipment of foreign origin. Further transportation to the site, where the CAAQMS's are to be installed and commissioned shall be completed by the contractor **within Sixty (60) days** from the date of arrival of equipment at port of de-embankment.

8. O&M Contract

The contractor shall carry out Operation & Maintenance of Air Monitoring Station for a period of five (5) years from the date of commissioning of the station, which can be extended up to three (3) years at the mutually agreed rates and terms & conditions.

9. WARRANTY / O&M CONTRACT

Period of O&M Contract

The complete CAAQM shall be under Operation & Maintenance Contract from the date of commissioning of the station and maintenance of all the equipment including supply of all material shall be the responsibility of the Contractor during the validity of Operation & Maintenance Contract. If, for reasons attributable to the Contractor, the Contractor shall make such changes, modifications, and/or additions to the Equipment or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own costs and expenses and to carry out further performance test.

10. The successful tenderer should submit the Indemnity bond as per the format enclosed.

TO BE EXECUTED BY SUCCESSFUL BIDDER

INDEMNITY BOND FOR HANDING OVER AIR MONITORING STATION INCLUDING ALL EQUIPMENT TO THE O&M CONTRACTOR

This Indemnity Bond is made this…….. days of……. By ……. a Company registered under the Companies Act, 1956/ Partnership firm / Proprietary concern having its registered office at…….. (hereinafter called as "Contractor" or "obligator" which expression shall include its successors and permitted assigns) in favour of **Tamilnadu Pollution Control Board**, with Office at 76, Mount Salai, Guindy, Chennai - 600 032, which term shall include permitted assigns and successors (hereinafter called "TNPCB" which expression shall include its successors and assigns).

Whereas TNPCB has awarded to the Contractor, a contract for O&M of the ……. number of Continuous Ambient Air Monitoring Stations (CAAQMS), located at ……. vide its Letter of Indent /Award Letter/ Contract No……. dated……. and its Amendment
No. ___ (applicable when amendments have been issued) (hereinafter called the "Contract"), in the terms of which Contractor shall be responsible for the Equipments to be handed over to it by TNPCB for the purpose of performance of the Contract (hereinafter called the "Equipments").

Now, therefore this Indemnity Bond witnessed as follows:

1. That in consideration of various Equipments as mentioned in the Contract, valued at Rs. (Rupees …….) to be handed over to the Contractor for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep TNPCB indemnified, for the full value of the Equipment. The Contractor hereby acknowledges receipt of the Equipments as per details in the Schedule appended hereto.

2. That the Contractor is obliged and shall remain absolutely responsible for the safe custody of the Equipments at Continuous Ambient Air Monitoring Station (CAAQMS) belonging to TNPCB against all risks whatsoever till the Equipments are duly used in accordance with all terms of the Contract. The Contractor undertakes to keep TNPCB harmless against any loss or damage that may be caused to the Equipments.

3. The Contractor undertakes that the Equipments shall be used exclusively for the performance/ execution of the Contract strictly in accordance with its terms and conditions and no part of the Equipments shall be utilised for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purposes including legal / penal consequences.

4. That TNPCB is and shall remain the exclusive Owner of the Equipments free from all encumbrances, charges or liens of any kind, whatsoever. The Equipments shall at all times be open to inspection and checking by Engineer-in-Charge/ TNPCB shall always be free at all time to take possession of the Equipments in whatever from the equipments may be, if in its opinion, the equipments are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds itself and undertakes to comply with the direction or demand of TNPCB to return the Equipments without any

demur or reservation.

5. That this Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the equipments or the same or any part thereof is misutilised in any manner whatsoever then the Contractor hereby agrees that the decision of the Deputy Director(Labs)-Air of TNPCB as to assessment of loss or damage to the Equipments shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and / or damaged Equipments at its own or remedy that may be available to TNPCB against the Contractor under the Contract and under this Indemnity Bond.

6. Now the condition of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this bond to the satisfaction of TNPCB, then the above bond shall be void, but otherwise, it shall remain in full force and virtue.

In witness whereof, the Contractor has hereunto set its hand through its authorised representative under the common seal of the company, the day month and year first above mentioned.

SCHEDULE NO. 1

Particulars of the Equipments handed over	Quantity	Value of the Equipment	Signature of Authorised Person

For and of behalf of
M/s.....

Witness I

1. Signature
2 Name
3. Address

Name
Signature
Designation
Authorised representative

Witness II

1. Signature
2. Name
3 Address

(Common Seal)
(In case of Company)

Note:* Indemnity Bonds are to be executed by the authorised persons and (i)In case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case, (ii) the original Power of Attorney it is specifically for our contract or a photostat copy of the Power of Attorney if it is a General Power of Attorney and such documents should be attached to Indemnity Bond.

SECTION - IV

TECHNICAL BID TO BE ENCLOSED IN COVER – A

(To be enclosed along with technical bid in Cover - A)

Check List – A (Technical bid)

		Page No.	YES	NO
1.	Earnest Money Deposit (Rs.2,00,000) and cost of Tender Document (Rs.1000) if downloaded.			
2.	Declaration Form in Annexure-I			
3.	List of customers using the instrument quoted including model number with addresses and phone number.			
4.	Operation and maintenance manual of the instrument quoted.			
5.	Technical specifications of the item quoted in compliance with TNPCB specifications in Annexure - III & IV (Page 29 to 55 & 97)			
6.	List of address of service centre in Tamilnadu / other states.			
7.	The original tender schedule duly signed by the tenderer at the end of each page. (Page 1 to 24)			
8.	The Power of Attorney authorizing the signatory of the Bid to commit the Bidder.			
9.	Attachments in support of meeting qualifying requirements (Attachments 1, 1A,2,2A,3,4,5,6,7,8 & 9.)			

10.	Copy of certificate of local branch, sales, residential and representative office (s) of the Bidder in India as per certificate form pursuant to Attachment 5			
11.	Certificate from manufacturer stating the country of origin of each Equipment duly authenticated by competent authority of that country (Attachment 6)			
12.	List of Equipment and consumables offered with manufacturers details (Attachment 7 & 8).			
13.	Pre-requisites for installation of equipment offered (Attachment 9).			

(to be enclosed in **Cover - A**)

ANNEXURE – II

DECLARATION FORM

I / We ……...

having our office at

……

……

……

……

1. declare that I / We have carefully read all the conditions of the tender floated for the **“supply, installation, commissioning and operation & maintenance services for continuous ambient air quality monitoring stations (CAAQMS)”.**

And abide by all the conditions set forth therein.

Place: Signature with Seal

Date :

Address:

ANNEXURE-III

Tamilnadu Pollution Control Board

Technical Specifications-CAAQM station

The equipments required for one Continuous Ambient Air Quality Monitoring Station.

The systems should be complete in functional. Material which are not specified in the specification but required to be felt as supporting/essential as per the norms and purpose must be supplied by the vendor.

Schedule No.	Brief Description	Qty. in nos.
1	Continuous Automatic Air Quality Monitors analyzers for CO, SO_2, NO_2+NH_3, O_3, and Beta Gauge $PM_{2.5}$ and PM_{10} Monitors.	1 unit each
2.	BTX Monitor/ Analyser	1 Unit
3.	Multi-calibration systems for gaseous monitors comprising of gas supply / generation and automated calibration	1 Unit
4.	Meteorological Instrumentation comprising Wind direction, Wind speed, Vertical wind speed, Ambient temperature, Relative humidity, Solar Radiation, Barometric Pressure and Rainfall mounted on telescoping crank up meteorological Mast.	1 Set
5.	DAS system consisting of one PC along with Laser Printer at the monitoring station and one PC at central office with peripherals along with software for data acquisition / Data display Board / transfer and system integration, telephone, Modem.	1 Lot
6.	Modem	2 Units
7.	Data display system	1 Unit
8.	Sampling line, Internal fitting, Instruments racks, Electrical and Gas line fittings, Tools (electrical and mechanical) and furnitures .	1 Unit
9.	UPS, 10 KVA (2hr. full load back-up)	1 Unit
10.	UPS, 5 KVA (2hrs. full load back-up)	1 Unit
11.	Split Air Conditioner (2 Ton capacity)	2 Nos.

Technical Specifications for the Continuous Ambient Air Quality Monitoring (CAAQM) station

1. MONITORING STATION

1.1 Monitoring Station is designed for housing the ambient air quality monitoring instruments to protect them from dust and heat. Temperature and Humidity sensors shall be installed in the housing for checking the humidity and temperature inside the station. Necessary Nos. 19" racks shall be installed inside the station so that the analysers are easily accessible from front & back for calibration and maintenance. Concrete housing will be provided by TNPCB. All other infrastructure work for setting up the stations viz., flooring mat, paneling, furnishing, internal wiring for Air conditioning and UPS shall be provided by the operator/O&M contractor.

Station Furnishing:

i) Necessary no. of 19" rack cabinet to accommodate all the analysers.

ii) Fire extinguishers - 2 Nos.

iii) Furniture:

a) Material – Furniture made of water resistant laminated board.

b) Cupboard - As per requirement

c) Working table - Powdered coated MS frame size 1400 x 900 x 750mm (wxdxh) and top 19 mm thickness board.

d) Revolving chair- 2 nos.

(iv) **Miscellaneous**

a) The exhaust gases from the analyser should be collected and discharged by a common exhaust pipe and should be vented.

b) Folding aluminium ladder for roof access

c) Thermostat for measuring the temperature inside the station

d) Hydro Meter for measurement of Humidity inside the station

e) Mounting bracket for the ladder

f) Fire and smoke detectors with alarms

g) Notice board.

2.0 AIR CONDITIONER (Preferred O'General make)

2.1 Type: Split type to be operated alternately by an automatic programmable timer. Separate Voltage stabilizers will be provided with each unit.

2.2 Power supply: 230 Volts $\pm$ 10 volts AC and 50 Hz $\pm$ 3%

2.3 Capacity: 2.0 Ton. The indoor units should be running alternately at an interval of one hour with timer control and the temperature inside the station should be maintained at $25C^0$ inside during peak summer months.

2.4 Refrigerant: Eco Friendly

3.0 ON LINE UNINTERRUPTED POWER SUPPLY (UPS)

3.1 Single phase 10 KVA UPS along with Automatic Delayed Restoration Device (ADRD) with 2 hours backup in full capacity should be provided for the smooth operation of one 2 Ton capacity split AC at the station.

3.1.1	Capacity		:	10.0 KVA
3.1.2	Technology		:	PWM using IGBT / MOSFETS
3.1.3	Crest Factor		:	More than 3: 1
3.1.4	Input	Voltage	:	230 V AC
		Voltage Range	:	± 25%
		Frequency	:	50 Hz ± 3%
3.1.5	Output	Voltage	:	230 V AC
		Voltage regulation	:	± 1%
		Frequency	:	50 Hz
		Frequency regulation	:	± 0.01%
		Waveform	:	Pure sine wave
3.1.6	Battery	Battery type	:	Sealed maintenance free
		Back up time	:	1 Hour at full load
		Battery Capacity	:	For required backup time
		Recharge time	:	5 hrs to 90% after complete discharge
3.1.7	Distortion		:	Less than 1% on linear load
3.1.8	Power factor		:	0.9 to 1
3.1.9	Indicator		:	L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery
3.1.10	Alarm		:	Audible alarm for battery backup, battery low, and fault
3.1.11	Protections	Surge	:	Surge suppression meets BIS or International standard
		Overload	:	Fuse & current limited
		Short circuit	:	Fuse & current limited & cut – off
		Battery low cut – off	:	No battery drain after cut - off
3.1.12	Overload Capacity		:	110% for continuous load
3.1.13	Efficiency		:	More than 90%
3.1.14	Environment	Operating Temperature	:	$0 – 50^0$ C
		Operating Humidity	:	10% to 95% (Non condensing)
		Audible Noise	:	Less than 45 db (at 1 meter)

3.2 Single phase 5 KVA UPS along with Automatic Delayed Restoration Device (ADRD) with 2 hours backup in full capacity should be provided for the smooth operation of Analyzers and peripherals at the station:

3.2.1	Capacity		:	5.0 KVA
3.2.2	Technology		:	PWM using IGBT / MOSFETS
3.2.3	Crest Factor		:	More than 3: 1
3.2.4	Input	Voltage	:	230 V AC
		Voltage Range	:	± 25%
		Frequency	:	50 Hz ± 3%
3.2.5	Output	Voltage	:	230 V AC
		Voltage regulation	:	± 1%
		Frequency	:	50 Hz
		Frequency regulation	:	± 0.01%
		Waveform	:	Pure sine wave
3.2.6	Battery	Battery type	:	Sealed maintenance free
		Back up time	:	2 Hours at full load
		Battery Capacity	:	For required backup time
		Recharge time	:	5 hrs to 90% after complete discharge
3.2.7	Distortion		:	Less than 1% on linear load
3.2.8	Power factor		:	0.9 to 1
3.2.9	Indicator		:	L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery
3.2.10	Alarm		:	Audible alarm for battery backup, battery low and fault
3.2.11	Protections	Surge	:	Surge suppression meets BIS or International standard
		Overload	:	Fuse & current limited
		Short circuit	:	Fuse & current limited & cut – off
		Battery low cut – off	:	No battery drain after cut - off
3.2.12	Overload Capacity		:	110% for continuous load
3.2.13	Efficiency		:	More than 90%
3.2.14	Environment	Operating Temperature	:	$0 – 50^0$ C
		Operating Humidity	:	10% to 95% (Non condensing)
		Audible Noise	:	Less than 45 db (at 1 meter)

4.0 GENERAL SPECIFICATIONS FOR ALL ANALYSERS

4.1 The ON/OFF switch and display of the entire important status signals viz., Sample flow, failure status, temperature, concentration, range switch, manual / auto mode, zero / span mode should be on front panel.

4.2 The analysers should operate at operating voltage 230 volts ± 10 volts AC and 50 Hz ± 3%. The power supply input to be protected against spikes from and to the analyser by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.

4.3 The Manufacturer shall provide minimum of 2 weeks of training on operation, preventive maintenance data management and interpretation for at least two persons at the installation site at their cost.

4.4 The calibration gases for all the analysers shall be provided with the system and shall have traceability to NIST and produce necessary certificates.

4.5 All ambient gas analysers shall conform with the USEPA automated reference / TUV / EN or equivalent method designation as required by the specification for individual equipment / parameters. Method of measurement used shall also comply with the stipulation on National Ambient Air Quality Standards (NAAQS) 2009 (Details of Methods of Measurement is available at MoEF and CPCB websites). All analysers shall be micro – processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analysers and sensors should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the Calibration & test certificate provided with each analyzer.

4.6 Meteorological sensors should be sturdy to coastal weather and should be coated with moisture, acid and alkaline resistant.

4.7 The manufacturer shall provide 1 year normal warrantee and four years extended warrantee on maintenance contract for the entire system.

4.8 Each set of analysers and other equipments shall be supplied with two copies of elaborate Operation manuals comprising details in three parts:

Parts (I)	should comprise installation, operational and troubleshooting details;
Parts (II)	should have details about preventive, routine and corrective maintenance; and
Parts (III)	should comprise details of all electrical, electronic and

	pneumatic circuit diagrams, details of each spare parts, Catalogue No. etc., and details of each electronic card / PCB's.
Parts (IV)	Schematic diagram for possible repair maintenance.

4.9 **Digital Output**

Multi drop RS 232 port shared between Analyzers, Dust Monitor ($PM_{2.5}$ & PM_{10}), Meteorological Sensors and computer for data, status and control.

4.10 **Quality Control and Standard**

Data shall be collected and validated according to USEPA standards, using the methodologies included in 40 Code of Federal Regulations. All analyzers shall have current USEPA reference or equivalent method designation and shall be of the latest design.

Seller shall submit a Standard Operating Procedure for the air quality monitoring stations to the Buyer at the time of bid submission. This Standard Operating Procedure shall be mutually agreed and approved by the Buyer prior to award. The Standard Operating Procedure shall contain the following activities:

1. Operating procedures for all analyzers and meteorological sensors
2. Calibration procedures
3. Calibration schedule
4. Maintenance procedures
5. Maintenance schedule
6. Statistical data validation procedures
7. Quality Assurance procedures
8. Quality assurance documentation
9. And the sample reports of the above should be clear and understandable both graphical and as reports.

The calibration procedures for analyzers shall conform to USEPA methodologies and shall include, daily calibration checks, biweekly precision checks and linearity checks every six weeks. All analyzers shall undergo full calibration check every six weeks. Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to the Buyer along with the Air Quality Data.

:

4.11 **Air Quality Reports**

Air Quality Data shall be submitted to the Buyer on a monthly basis in the form of an Air Quality Report. This report shall include, tabular and graphic information on gas and dust concentrations as well as meteorological data for each site. The data to be reported are 1 hour, daily, weekly and monthly averages, minimums, maximums, standard deviations, total data captured and percent data capture, variance, etc. In case of any discrimination on the data, the contractor has to provide averages for any duration of the period .The Air Quality Report shall also include wind roses and pollution roses.

The Seller shall agree to submit to an audit of calibrations conducted by a third party following USEPA methodologies. The results of these audits shall be made immediately available to both the Seller and Buyer compliable and auditable at any time at the site.

4.12 **Suppliers should offer their remarks on the compliance of every point of the Technical Specifications for the Continuous Ambient Air Quality Monitoring (CAAQM) System prescribed by TNPCB.**

5.0 SPECIFICATIONS OF SAMPLING SYSTEM

A suitable sampling system as specified by USEPA having 10 ports manifold and fitted with a suction pump to draw ambient air. System duly equipped with moisture removal systems should be provided for sampling of ambient air separately for gaseous and dust measurement.

Gases sampling system:

5.1	Height of the sampling system:	Approx. 1.0 meter above the roof
5.2	Roof entry cut out:	Stainless Steel
5.3	Conduit:	Stainless Steel
5.4	Inner sampling system:	Borosilicate glass
5.5	Sampling head:	Stainless Steel
5.6	Manifold:	10 port for tubes 6 x 1 mm, self-tightening

6.0 SPECIFICATIONS OF 19” RACK

Suitable 19" Rack cabinets to accommodate all analysers, calibrators, Zero air generators, data logger etc. should have adequate fittings and sliding facility for maintenance shall be provided.

7.0 AMBIENT AIR QUALITY MONITOIRNG ANALYSERS

(A) AMBIENT OXIDES OF NITROGEN ANALYSER ALONG WITH AMMONIA CONVERTOR (NO-NO2-NOX& NH3) conforming to USEPA Automated Federal Reference Method (FRM) Designation

01	Principle	:	Chemiluminescence
02	Measurement	:	NO-NO_2-NOx-NH_3 in Ambient Air
03	Display / units	:	Digital / ppb, µg/m^3
04	Ranges	:	Auto ranging 0-2000 PPB
05	Minimum Detectable Limit	:	1 PPB
06	Noise	:	0.5 PPB
07	Zero Drift	:	< 1 PPB / 24 Hrs.
08	Span Drift	:	<2% in 15 days of full scale
09	Response Time	:	60 seconds or earlier
10	Calibration	:	One number of 10 litres capacity cylinders for calibration gas to be supplied **per station**. The cylinders to be duly filled with NO gas (NIST traceable). And it should have necessary numbers of two stage regulators.

(B). AMBIENT SULPHUR DIOXIDE (SO_2) ANALYSER Conforming to **USEPA** Automated Federal Equivalent Method (FEM) Designation

01	Principle	:	UV Fluorescence
02	Measurement	:	Sulphur Dioxide in Ambient Air
03	Lower Detectable Limit	:	1 PPB
04	Ranges	:	Auto ranging 0-500 PPB
05	Display / units	:	Digital / ppb, µg/m^3
06	Noise	:	0.5 PPB
07	Zero Drift	:	< 1 PPB/24 Hrs. with automatic zero compensation
08	Span Drift	:	<2 PPB full scale in 15 days

09	Calibration	:	One number of 10 litres capacity cylinders for calibration gas to be supplied **per station**. The cylinders to be duly filled with SO_2 gas (NIST traceable). And it should have necessary numbers of two stage regulators.

(C) AMBIENT OZONE (O_3) analyser Conforming to **USEPA** Automated Federal Reference Method (FRM) Designation

01	Principle	:	UV Photometric
02	Measurement	:	Ozone in Ambient Air
03	Display / units	:	Digital / ppb, µg/m^3
04	Ranges	:	Auto ranging 0 - 500 PPB
05	Minimum Detectable Limit	:	1.0 PPB
06	Noise	:	0.5 PPB
07	Zero Drift	:	0.5 ppb per month
08	Span Drift	:	< 1% per month
09	Flow Rate	:	1-3 Litres / Minute
10	Calibration	:	Please see calibration section (F).

(D) AMBIENT CARBON MONOXIDE (CO) ANALYSER Conforming to **USEPA** Automated Federal Reference Method (FRM) Designation

01	Principle	:	Non Dispersive Infra-Red (NDIR)
02	Measurement	:	Carbon Monoxide in Ambient Air
03	Display / units	:	Digital / ppb, µg/m^3
04	Ranges	:	At least four ranges Auto ranging 0 - 100 PPM
05	Noise	:	0.05 PPM
06	Minimum Detectable Limit	:	0.1 PPM
07	Zero Drift	:	< 0.2 PPM / 7 days

08	Span Drift	:	< 1% full scale in 24 hrs.
09	Calibration	:	One number of 10 litres capacity cylinders for calibration gas to be supplied **per station**. The cylinders to be duly filled with CO gas (NIST traceable) And it should have necessary numbers of two stage regulators.

(E) BTEX ANALYSER Conforming to **USEPA** Automated Federal Reference Method (FRM) Designation

01	Detector	:	Photo Ionization Detector (PID)
02	Parameters	:	Benzene,Toluene,Ethyl-benzene and o,m,p-Xylene
03	Range	:	0 – 100 ppb or 0-500 µg/m3
04	Units	:	µg/m^3, ppb, ppm
05	Repeatability	:	+/-1% full scale
06	Drift	:	+/-1% of full scale (24 hours)
07	Response	:	T90< 30 seconds
08	Calibration	:	The calibration gas mixture(low range) to calibrate BTEX analyser to be supplied in one 10 litres cylinder **per station** with regulators should be NIST traceable.

(F) MULTICALIBRATION SYSTEM

(a) Gas Calibration System

The calibration system for air monitoring equipment (listed above) should incorporate an automatic gas dilution calibrator, calibration gas standards and a high performance zero air generator to calibrate all of the analysers in the system. The calibration cycles should be able to be configured though the Data Acquisition System and compactable to existing TNPCB software at any specific time during the day or night. It should be mounted on standard 19" rack.

The dilution calibrator should be able to perform mixing of source gas, from the calibration gas bottles, with zero air generators, in order to generate a wide range of calibration gas concentrations and minimizing the number of calibration gas

standards required. All the calibration gases provided along with the system MUST be NIST traceable. It should also have facility for Gas Phase titration (GPT) having Ozone generator of 6 PPM / Ltrs and the converter efficiency should be 100% for conversion of NO_2 concentration to NO. The system should also have the facility to calibrate the Ozone analyzer.

(b) Meteorological, Flow and Electronics Calibration

The supplier should provide calibration devices for all the meteorological and other electrical equipment mentioned above as per the specifications of the manufacturers.

(G) PM_{10} MONITOR **c**onforming to USEPA Automated Federal Equivalent Method (FEM) Designation (β-ray attenuation)

01	Principle	:	β-ray attenuation
02	Measurement	:	Continuous measurement of PM_{10} in ambient air.
03	Measuring Range	:	0 to up to 2,000 µg/m^3
04	Resolution	:	1µg/m^3
05	Minimum Detectable Limit	:	1µg/m^3
06	Source	:	Beta source with better/longer half life period
07	Air Flow Rate	:	At least 16.7 LPM
08	Filter Material	:	Glass Fiber Filter
09	Display	:	LED /LCD
10	Calibration	:	Separate calibration standards must be provided with the instrument.
11	Measurement Result	:	1/4,1/2, 1, 8 and 24 hours averaging with Real Time Data

(H) $PM_{2.5}$ MONITOR Conforming to USEPA Automated Federal Equivalent Method (FEM) Designation (β-ray attenuation)

01	Principle	:	β-ray attenuation
02	Measurement	:	Continuous measurement of $PM_{2.5}$ in ambient air.
03	Measuring Range	:	0 to up to 2,000 µg/m^3
04	Resolution	:	1µg/m^3

05	Minimum Detectable Limit	:	1µg/m^3
06	Source	:	Beta Source with better/longer half life period
07	Air Flow Rate	:	At least 16.7 LPM
08	Filter Material	:	Glass Fiber Filter
09	Display	:	LED /LCD
10	Calibration	:	Separate calibration standards must be provided with the instrument.
11	Measurement Result	:	1/4,1/2, 1, 8 and 24 hours averaging with Real Time Data

(I) SPECIFICATIONS OF METEOROLOGICAL SENSORS

a) **Wind Direction**

The sensor to provide low starting threshold, fast response and accuracy over a wide operating range in adverse environmental conditions (should be sturdy to coastal weather.)

Specifications are as follows:

Accuracy	:	$\pm 5^o$ deg
Wind Direction operating Range	:	0^o to 360^o degrees
Temperature Operating Range	:	0 ^oC to 50 ^oC

b) **Wind Speed**

The anemometer to provide a low starting threshold, wide dynamic response and high accuracy over a wide range of wind speeds and a variety of environmental conditions.

Specifications for the wind speed sensor are as follows:

Maximum Operating Temperature Range	:	0 - 50 m/s 0 ^oC to 50 ^oC
Accuracy	:	0.2 m/s or 1%, whichever is greater

c) **Vertical Wind Speed**

The anemometer specifications are as follows:

Maximum Operating Range	:	30 m/s.
Out put	:	m/s.

d) **Ambient Temperature**

Temperature measurement system specifications are as follows:

Calibrated Temperature Range	:	0 ^{o}C to 50 ^{o}C
Accuracy	:	0.1 ^{o}C

e) **Relative Humidity**

Specifications are as follows:

Measuring Range	:	0 to 100% RH
Accuracy	:	$\pm$ 1.0% (5 - 95% RH)
Temperature Range	:	0 ^{o}C to 50^{o}C

f) **Solar Radiation**

The detector should be able to measure short - wave radiation which comprises the direct component of sunlight and the diffuse component of skylight.

Specifications are as follows:

Spectral range	:	400 – 1100 nm
Solar radiation intensity	:	0 - 2000 W/m^2
Resolution	:	1 W/m^2
Calibration	:	Calibrated against an Eppley Precision. Spectral Pyranometer (PSP) under natural day light conditions. Absolute error under these conditions is 5% maximum, typically 3%

g) **Rain Fall Monitor**

Principle	:	Tipping bucket
Resolution	:	0.2mm
Accuracy	:	0.5% at 0.5mm per hour

h) **Barometric Pressure**

Operating range	:	800 to 1100 hPa / millibar
Operating temperature	:	0^{o}C to 50 ^{o}C
Response Time	:	1 m sec

Telescoping Crank – up Meteorological Tower

The wind direction, wind speed, vertical anemometer and temperature sensors are to be mounted on the Meteorological Tower of 10 m height. The tower is to be a free standing (self supporting) four section telescoping tower provided with a hand crank to raise and lower instruments mounted on the top section.

Specifications are as follows:-

Extended Height	:	10 meters
Retracted Height	:	2 meters
Number of Sections	:	4
Construction material	:	Galvanised steel or aluminium

(k) SPECIFICATION OF SOFTWARE FOR CAAQMS.

A. DATA ACQUISITION SYSTEM IN THE STATION

SPECIFICATIONS OF STATION SOFTWARE

The station software captures data from all channels in the system and stores in the Personal Computer. Personal computer is used for calibration and configuration of each channel.

1) Data Acquisition

a) Frequency of data acquisition
   i) User selectable 1, 5, 30, 60, 120 second averaging duration online digitally.
b) Channel size
   i) 32 Channels or more supported
   ii) Expandable to 64 channels, if required in future
c) Data input
   i) Either Analog (0-1 volt / 0-10 volt / 2-20mA / 4-20mA)
   ii) Or Digital (firm will develop the protocol, if required without additional cost within project duration) to configure with the PC.
d) User configurable channels, stations and equipments with communication parameters.
e) Analyzer data channel should comprise of Name, Units, Communication Address, Validity Range, Operation and Error Status.
f) Provision to incorporate conversion factors such as PPB to $\mu g/m^3$ etc.
g) Software should be equipped to configure the analysers with it, irrespective of the output mode i.e. Analog or Digital (RS 232) of the instrument.
h) System should read raw data values of the analyzers and meteorological instruments and duration of averaging data should be user selectable like 10 / 20 / 30 / 40 / 50 / 60 seconds.
i) The output should be converted into realistic data in prescribed units.

2) Data Collection

a) Software should collect each second data.

b) Average data over user selectable time (1, 5, 30, 60 seconds time interval) period.
c) Operational status, Error status, calibration status and calibration values observed from the analyzer should be captured and should be made available along with the data with a frequency of maximum five minutes.
d) System should collect of the diagnostics of the instrument comprising actual diagnostics parameters and their values at least once in every five minute to check the state of the health analyzer.
e) Calibration parameters
    i) Provision to entering calibration, span calibration values of gas cylinder/permeation to devices
    ii) Provision for collecting zero calibration, span calibration values(pre calibration & post calibration) in to the database for further analysis.
    iii) Provisions to collect electronic system pre calibration & post calibration to ascertain the percentage deviation/ correction apply during each calibration.

3) Data Storage

a) Data along-with diagnostic, calibration, alarms should be stored at station computer at a defined path.
b) Interval of data dumping will be same as defined in the data collection
c) System should be capable to keep every minute acquired data from 32 channels for a period of minimum five years.
d) Data stored should be plain text format
e) No data encryption should be done at the station and if encryption is done than decryption procedure should be made available in soft file format to check the data at station at any point of time. To convert data on continuous basis for exporting to any other software, if required, procedure should be available without any licensing.

4) Data Display (Statistical analysis of data)

a) In 4-in-4 graphs, 4-in-1 graph and / or 16-in-1 graph formats
b) In terms of 4-in-1 table format
c) Real time multi – graphs over user selectable time period.
d) Display of graphic & tabular display of the current data.
e) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)
f) Tabular form should comprise of 4 channel list in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)
g) Station instruments basic configuration etc. should be visible on screen continuously.
h) Main window for real time display of all measured parameters with status of all analyzers/sensors.
i) Statistical analysis tools like regression analysis, co-relation analysis and other analysis as per industry standards in the field of environment should be available and if not the firm should develop these for TNPCB within a time frame.
j) The system should have procedures for normal analysis tools like calculation of data with respect to a threshold value, average, minimum, maximum, calculation of violating value with respect defined values (Air Quality Standards) for defined period for the database etc.
k) Data analysis of diagnostics parameters

l) Data analysis of Pre calibration and post calibration data (if facility not available can be developed)
m) Data analysis of corrections applied of each calibration cycle (if facility not available can be developed)

5) Data Backup

a) There should be defined data backup procedure through which data can be extracted from station computer in simple text format / excel (user definable).
b) There should be defined restore procedure also to restore the data in case of data loss.
c) A display screen should be available to update the user about data availability.

6) Data Validation automatic checks at station software

a) Zero level and span level checks if performed cyclically and defined results are not obtained up to +/- 5% (user definable 0-10%) then system should alarm the user of system failure and the recorded alarm should be transmitted to central software.
b) After instruments perform the calibration the results obtained should be recorded and should be transmitted to central computer.

7) Data validation requests generated at station computer

At least three tier request generation and request acceptance system procedure is desired. Details are given in the **Annexure –I**.

a) Inbuilt checks capability may be provided, where if instrument throws erratic data software can check automatically and display message and send information in the form of corrected data in corrected database to be approved by the central software at central level. (facility if not available needs to be developed by the system provider)
b) There should be provision of two databases one is raw database and another corrected database. (facility if not available needs to be developed by the system provider)
c) Validation of data through calibration database Pre calibration & post calibration values collected.

8) Calibration of systems

a. Calibration window for analyzer for the calibration from computer.
b. Remote Access to Calibration: Calibration exercise need to be done remotely. All necessary arrangements for it should be made in the system.
c. Calibration data file may be prepared separately.
d. Calibration database need to be formed, stored and transmitted to central.
e. Calibration cycles to be as per the models of the instruments.
f. Calibration records should store the calibration values displayed by instrument.
g. Diagnostics during calibration should also be recorded.

9) Location of station

a) Fixed Station location to be recorded
b) Latitude and longitude of stations be recorded

10) Data transfer to Central

All data captured at station computer should be transferred to central software.

a) User selectable time frame for transmission of data to central server.

b) Diagnostics (actual diagnostics parameter values recorded each time in the station), configurations(station channel configurations), alarms(generated alarms) should be transmitted.

11) Data transfer to Display Boards

The system provider is responsible to make necessary software provisions to connect output on display boards. The formats of files may vary, the formation of defined formats is the responsibility of system provider for the project duration.

a) Software should be capable to transfer and display online data (minutes and hourly) on display board at the station location.
b) The data in user defined formats (customizable) should be made available for continuous display.

B DATA ACQUISITION SYSTEM AT THE CENTRAL STATION

SPECIFICATIONS OF CENTRAL SOFTWARE

Data communication system handles the data transmission of an ambient air quality network and receives incoming messages / signals from remote stations. The central software processes signals and data and displays it on the web and other interfaces. Detailed requirement is as below:

Software at Central Station

a) Software should not have any restriction on number of locations and computers either technologically or in terms of licensing.
b) Should display multiple stations on - line data (momentary values) in tabular text and graphic format.
c) Data should be received by the central from all locations within 5minutes duration or at user defined time intervals.
d) Data along-with diagnostics and calibration details should be transmitted at central from all connected locations.
e) Should support dialup systems, broadband connectivity, wireless connectivity, 2G or 3G or any new technology which shall be in place during project time should be compatible and if not need to developed by the system provider up-to project duration without additional charges.
f) Should have the remote control facilities for calibrations (Zero & Span) of instruments and measuring range modifications.
g) Should have facility for displaying data communication error reports, image management which should be recorded and should be available for display.

2) Data Display at Central

a) In 4-in-4 graphs, 4-in-1 graph and/or 16-in-1 graph formats
b) In terms of 4-in-1 table format
c) Real time multi – graphs over user selectable time period.
d) Display of graphic & tabular display of the current data like simple 3D line and column chart, polar diagnostics and 3D perspective column chart.
e) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)

f) Tabular form should comprise of 4 channel list in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)
g) Display of data using selectable name of different stations.
h) Generation of Wind Roses, Pollution Roses (12 & 16 directional i.e. 0 degree, 22.5, 45, 67.5, 90 and 360 degree) with user defined time limits.
i) Calculate vector mean of wind direction.
j) Programmable down loading of data.
k) Comparison of data w.r.t. Standards in Graphical form and tabular form with information of values exceeds the Standards.
l) Specific data zooming facility
m) Database correction procedure
n) Separate user ID and Password for correction of database so that all regional level users if authorized can validate their regions data and the events be recorded along-with ID and time.
o) Data validation trail recording.

3) Data Export

a) Customizable data format developing capability required.
b) Possibility to export the data files in Excel, Text and other formats Tabular form should be in user defined format i.e. 1, 5, 10, 15, 30 min, 1 hour, 4, 8, 24 hour, 30 days and yearly.

4) Data Import

a) In case of communication medium phase there should a mechanism to shift the data into Pen drive (Physical medium for data collection) physically and a procedure to import the same on central software.

5) Printing

a) Possibility to connect different types of printers and auto printing facility for all displays generated throughout the analysis of data at any point of time.

6) Data Validation automatic checks at Central software

a) Zero level and span level checks if performed cyclically and defined results are not obtained up to +/- 5% (user definable 0-10%) then system should generate alarm the user of system failure and the recorded alarm should be transmitted to central software and stored. There should be provisions to read these alarms in a database for corrective actions and for comparison of data for acceptability or rejection.
b) After instruments perform the calibration the results obtained should be recorded and should be transmitted to central computer and stored.
c) There should be provisions to configure at least 08 alarms for any given instrument auto check.

7) Data validation requests management at central computer (if not available facility may be developed by the firm)

a) Data validation requests sent by station computer should be recorded and the system should provide a window to user to accept or reject the reasons mentioned by the user end.
b) Inbuilt checks capability should be provided, which can be configured by the administrator at central to put alarms according to requirement on data, errors generated or on diagnostics of systems.

c) The software at central should have facility to log in data validation requests. These requests will carry the erroneous data for user selected period and for which user at station will request to change the data due to environmental or instrumental operation conditions. These requests will reside in central location and whenever user at central agrees the data will be changed in the validated database. Hence, system will have two types of databases 1) Raw database which can never be touched 2) which has to be modified and corrected as per agreed conditions. The detail of user requesting or applying changes in corrected database should be recorded with time.

7. Data Display at Web (**if not available facility may be developed by the firm**)

a) System should have standard web display software in place.
b) Central software should be capable to show the data in predefined formats at website on a physical map.
c) The data from Corrected database shall be displayed on the web.
d) Current data should be displayed on web page.
e) There should be provisions to show no. of violations occurred, percentage of violation occurred at stations parameters comparing hourly, 8 hourly, 24 hourly and yearly standards
f) Provision is required to change standard value, since standard values do change after certain period of time as per Govt. policy.
g) Displayed web page should have facility of providing information to all with respect to environment as well as to provide specific files for downloading.
h) The logo of TNPCB should be displayed on webpage.
i) The disclaimer have to be provided on the webpage
j) Some predefined queries have to be developed to display the data on web page. A search page needs to be developed for converting data into meaningful format for the general public. Help in developing such kind of systems can be taken from existing running system at www.cpcb.gov.in/caaqm and www.cpcb.gov.in/cpcbpa.
k) The current data displayed on the web should have comment inserting facility at individual data and for running data as well like if any station instrument out of order then station official should be able to display message “Instrument under maintenance”.
l) Similarly, when data goes beyond a defined limit it should automatically display a predefined message as comment on webpage as “Data under Scrutiny”.
m) Automatic e-mail and SMS alerts messages to be generated for the identified end users to start a corrective action.
n) Station photos to be uploaded for the display along-with the data.
o) User defined 05 pages may be developed additionally, if required by TNPCB designs for which may be decided mutually.

9) Data display at display board outside the office at central location also

Data display is also required at regional and central locations for which software provision has to be made at each location.

10) Remote Procedures (**if not available facility may be developed by the firm**)

a) Central software should have capability to allow to connect any station instrument through remote.
b) Central software administrator should be able to go for remote calibration of any of the systems.
c) Software should be capable to operate remote stations configurations.

d) Control panel window should be available for controlling each analyzer.
e) Alarm window for valid alarms of all analyzers and sensors.
f) It should have transparent data – connection to each analyzer from remote.
g) System should be capable to remotely configure all stations through remote location using configuration file to maintain the uniformity. The configuration command from central or from regional location should be active.

11) Data Reports Generation

a) To prepare reports hourly, weekly, monthly, yearly in user defined interval and formats.
b) Mean, Median, Percentile, Maximum, Standard deviation, Frequency analysis and Maximum Frequency analysis.
c) System should have predefined user selectable procedures through which reports of any specific station or multi stations reports up to four parameters can be generated as per user selected time frame.
d) Data Comparison
Software should be able to compare any of the four channels irrespective of type of data in the system with respect to each other on a single time scale user selectable.
e) Data Comparison on different time scale
Software should be able to compare data on the basis of different time scales like one station (x) parameter (y) of one given date is compared with other station (z) parameter (y) on any other date in a single graph.
f) Data reports, calibration reports and status reports with user time periods.
g) Historic multi – curves / graphs over user selectable time period.
h) Report generation over user selectable time period (instantaneous or averaged over a period of 1, 15, 30 min, 1 hr, 4, 8, 12, 16 and 24 hrs etc.).
i) Diurnal variation, standard deviation, regression and other statistical parameter reporting possibilities with various available mathematical methods.
j) If required separate report generation procedures have to be developed for which firm will be responsible for project duration.

C. Compatibility

Should have compatibility with the latest Operating System with a contract of 05 (five) years from the date of supply of software for providing assistance to operate system at TNPCB and all the new patches developed for the software during these 05 years without additional cost. Software should have capability of data transmission with the presently available PROTOCOL (list attached).

D. Security

a. System should have the facility to have it Password protected or without password as decided by CPCB at the time of implementation.
b. System software should be totally secured and any antivirus software required to run the system for the complete project duration has to be managed by the system provider.

E. Other Technical Conditions

1. Hardware required for data transmission has to be made available by the firm and there should not be non-compatibility.

2. Firm should have the capability to develop the Software PROTOCOL for data transmission from any system available in the field in future during next 05 years or up-to the project period.
3. Should support the latest formats of Windows 32 bit or 64 bit or any other available platform like Linux etc.
4. Manual of complete system should be provided in the form of storage device and Hard copy.
5. Firm should provide the hardware required for data acquisition along with all the software's required like OS, MS. Office, Networking software, Remote functionality software, Data uploading software on website, Data display software if required, and should maintain hardware for project duration.
6. Since, system has to be placed in NIC domain for which the web software developed along-with the database and web server software should be certified by CERT-IN empanelled vendors for vulnerability. The system provider is responsible for fulfilling all criteria required to place the system at NIC domain. The firm will be responsible for entire duration of the project for any vulnerability if noticed by NIC.

F. DETAILS OF DESIRED DATA VALIDATION SYSTEM

At least three tier request generation and requests acceptance procedure is desired in the system. It is presumed that level 1 is station, level 2 is Central location at regional level and level 3 at Central level.

The regional and central levels will have central station computers and software installed and stations will have station computer installed with station data acquisition software and data transmission software.

The flow of data has to be from station to Regional Level and then to Central level. It is desired that environmental database has to be corrected for instrumentation issues as well as for the environmental issues. Hence, officials available at stations will communicate with central and state levels through system itself by commenting on the data. The respective data can be picked up from the database at station itself, corrected to the desired numbers and then transmitted to regional level central computer where, the administrator of system if agrees to the changes desired then data flows to the next level else request is rejected. If request will come to Central server for accepting or rejecting then central level should have authority of accepting or rejecting the data. If central level agrees to the changes than data should be changed in the corrected database else request should be rejected. Hence, there should be provisions for accepting or rejecting data at all three levels accordingly. Here, whenever such requests are generated, concerned administrators need to be sent email alerts.

G. List of protocols for which CAAQM software should support

Bayern-Hessen	Intercomp5	FH62 Konf.	ChemPro 100
Intercomp 6	Intercomp 1	PVM100	MultiPD II
LabCom	Metek USA-1	VC820	X am 7000
Unor, Oxor	AK R+P	TSI 30222/25	HG Monitor 3000

Defor	MBF	Blendmaster	ESM FH40G
Multor	Gemi	Klimet	Travelpilot DX-V
Adam Module	Uras 14 Modbus	Thygan	AK Conf.
CLD700	Binos1000	USA Turbulence	Thermo Instr.
FH62	HP34970A	Thies DL14/15	PR820R
Hygrowin	Almemo	Innova1312	PAC3
Gesytec II	Modbus	Multiwarn II	Data Collect SDR
RFM433	DGH Module	MeteoBus	VDO Navigation
NMEA183	BH/Timo 9600	Windobserver	

The CAAQM software should also support any other protocols but not included to the above list for the following suppliers.

API-Teledyne, Thermo Fisher, Horiba, Ecotech, Synsspec, Dani, Metone, Environment s.a and Swan.

H. Checklist to compare Firm's Technical capability table for specifications of Software Table - 1

S. No.	Details	Capability of firm's software as on date	Firm agree or disagree to develop software in future	If firm agrees to develop application then time frame from individual activity
1.	Data transfer interval Max. 5 minutes from all locations?			
2.	System will transmit data along with diagnostics. If yes then how many channels diagnostics values shall be transmitted to central and at what duration?			
3.	System will transmit data along with Calibration values (Pre cal and Post Cal)?			
4.	System has remote calibration procedures in place for Regional level and central level both?			
5.	System has remote configuration facility for regional and central level both?			
6.	System has database validation procedure in place?			
7.	Web software already developed or not?			
8.	If Web software is available is it modifiable as per TNPCB need by the firm?			
9.	Whether agree to develop five web pages as per mutual discussion			
10.	Web software with password and or without password			
11.	Password providing facility available at regional levels			
12.	Statistical tools available at web software or not?			
13.	System provider is capable of placing system in NIC domain			
14.	System provider will provide certification from CERT-IN empanelled firms			

15.	Data import from other files			
16.	Data export to other files			
17.	Pre defined queries to be inbuilt for providing data to public whether these are already available or to be developed if yes then time frame?			
18.	Standards comparison and exceedances be reported on web			
19.	Different types of predefined formats of report preparation available or not?			
20.	support various protocols available till date as listed provided or not?			
21.	If new protocol based software is to be developed whether firm will			
22.	Unlimited Number of stations supported by Central Server software or not? If not then support for how many stations will be provided			
23.	System compatibility with Dialup/BB/2G/3G/Wireless available or not? If not then what technologies supported as on date? What time frame if other to be develop.			
24.	Software has Wind rose reports generating capability			
25.	Software has pollution rose generating facility			
26.	Software has diurnal variation facility			
27.	Software has mathematical tools			
28.	Software has 16 channels display at on page			
29.	Software has data communication error reports			
30.	System has error correction procedure			

31.	Software has parallel data display reports			
32.	Software has virtual channel deployment capacity			
33.	Software has data encrypting procedures at stations or not? If yes then data can be retrieved from station or not?			
34.	Software compatible for ANDROID technology			
35.	System Provider will provide all Hardware required at station and Central			
36.	System Provider all necessary software required for data acquisition, display, Analysis, website uploading etc.			

(l) **ANALYTICAL SOFTWARE**

The supplier should provide Windows (Latest) based software or better version which shall be upgradeable for five years free of cost for data acquisition from the DAS and for statistical analysis and reporting of the monitored parameters mentioned above. Analysis and reporting software should posses following minimum features:

- Windows latest version compatible
- File format conversation
- Statistical analysis of data for maximum, minimum, average and standard deviation for various time intervals using the monitored data
- Tabular and graphical format for report production
- Wind rose and Pollution rose graphs
- File export facility
- Website online data updating facility
- Windows based printer support

(m) **CENTRAL AND MONITORING STATION COMPUTER SPECIFICATIONS**

Make	:	DELL
Processor	:	Intel i5 + Intel board
RAM	:	6 GB DDR3
Hard disk	:	1 TB SATA
DVD Writer	:	LG or Sony
Monitor	:	22” LCD
Keyboard	:	104 keys Keyboard
Ports	:	6 USB(2 in front) , 1 parallel with COM and serial port
Mouse	:	Optical
Software	:	Windows(Latest) OS and Anti Virus (Latest) (Licensed version) and windows office latest

(n) **SPECIFICATIONS OF COLOUR LASER NETWORK PRINTER FOR CENTRAL AND MONITORING STATION (HP)**

01	Speed (pages per minute)	:	At least 20 ppm in Black & white and in colour
02	Resolution	:	600 x 600 dpi
03	RAM	:	128 MB
04	Main tray Capacity	:	At least 250 sheets
05	Interface	:	Hi speed USB
06	Operating System	:	Windows(Latest)
06	Power supply	:	230 V AC, $\pm$ 10 V AC, 50 Hz, $\pm$ 3%

8.0 SPECIFICATIONS OF DAY LIGHT & NIGHT VISIBLE DATA DISPLAY SYSTEM

8.1	Size of display System	:	6 ’ x 12 ’
8.2	Visibility range	:	200 Meters (Day Time)
8.3	Nos. of display Line	:	6
8.4	Display of colour elements	:	Multi Colour
8.5	Minimum life span of the system	:	10 years
8.6	Smallest Character Size	:	260mm x 190 mm (approx.)
8.7	Operating and Non Operating	:	0 - 50 ^{o}C

	Temperature		
8.8	Humidity Tolerance Range	:	0 - 100%
8.9	Languages supported by the display	:	English & Tamil
8.10	Colour Gradient	:	LED based or any other equivalent
8.11	Display Characters (Example)	:	

Sl.No.	**Parameters**	**Concentration ($\mu g/m^3$)**	**Standard Limit ($\mu g/m^3$)**
8.11.1	PM_{10}	160	100
8.11.2	SO_2	35	80
8.11.3	NO_2	79	80
8.11.4	CO	3320	2000
8.11.5	BTEX	------	------
8.11.6	NH_3	------	------
8.11.7	O_3	------	------
8.11.8	$PM_{2.5}$	------	------
And all the meteorological parameters			

The display of above data should be supported with moving messages / slogans to be changed from time to time

8.12	Input Power requirement	:	230 VAC ±10 VAC, 50 HZ ±3%
8.13	Display	:	Weather proof casing to cope up with Chennai weather.
8.14	Computer System	:	Software compatible with Pentium of latest version
8.15	General	:	The display system should be capable of displaying all the data generated by the CAAQMS through computer. The system shall also have the facility to display the environment message for public awareness. .

Attachment 1

PROFORMA FOR PERFORMANCE STATEMENT FOR MANUFACTURER
(for a period of last five years)

Bid No. _____ Name of Equipment _____ Date of Opening _____Time

_____

Name of the Manufacturer_____

Order placed by (full address of Purchaser)	Order No. & Date	Description of ordered equipment (Model no.)	Quantity supplied	Value of order	Date of commissioning and handing over	Has the equipment been satisfactory functioning? **(Attach minimum two certificates from the Purchaser/Consignee for each equipment)**
1	2	3	4	5	6	7

NOTE: Bidder to furnish above detail for each equipment of the quoted package on separate sheet.

Signature of the Authorized Representative

Name of the Person

Position

Attachment 1(A)

PROFORMA FOR PERFORMANCE STATEMENT FOR AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER

Bid No. _____ Name of Equipment _____ Date of Opening _____
Time_____
Name of the Manufacturer_____

Order placed by (full address of Purchaser)	Order No. & Date	Description of ordered equipment (Model no.)	Quantity supplied	Value of order	Date of commissioning and handing over	Has the equipment been satisfactory functioning? **(Attach minimum two certificates from the Purchaser/ Consignee for each equipment**
1	2	3	4	5	6	7

NOTE: Bidder to furnish above detail for each equipment of the quoted package on separate sheet.

Signature of the Authorized Representative

Name of the Person

Position

Attachment 2

<Letterhead of the Bidder>

FORM OF QUESTIONNAIRE

BIDDING DOCUMENTS
"SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQMS)

Date :

To :
Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032

From : Name of Bidder
Address
Name of Representative
Position
Fax No.
Email id.
Signature

Question

Signature of the Authorized Representative

Name of the Person

Position

Attachment 2(A)

<Letterhead of the O&M Partner>

FORM OF CERTIFICATE OF CARRYING OUT O&M OF CAAQMS BY THE O&M PARTNER IN INDIA

Date ;

To

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Sub. : Certificate of carrying out O&M of CAAQMS by the O&M partner in India.

This is to certify that we <Name of O&M Partner> hereby agree to carry out day to day Operation and maintenance of the CAAQMS installed and commissioned by <Name of the main bidder> for minimum of five years from the date of installation & commissioning of the CAAQMS at the rates quoted by <Name of the main bidder> against this tender, strictly in accordance with terms & conditions contained in this bid document.

Signature:
Name of Person:
Position:
Name of O&M Partner:
Office Seal of O&M Partner:
Legal Address of O&M Partner in India:

Counter-signed by main bidder
Name of Person:
Position:
Name of the Bidder:
Office Seal of Bidder:
Legal Address of Bidder

Attachment 3

CAPABILITY & EXPERIENCE OF O&M PARTNER

Name and address of the O&M Partner in India (if applicable):
(Not required in case of Bidder proposing to carry out O&M himself)

Sl. No.	Name of the O&M personnel proposed to be deployed	Educational Qualification	Experience in no. of years in carrying out O&M of CAAQMS.	Detail curriculum Vitae Attached (YES / NO)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

Signature of the Authorized Representative

Name of the Person

Position

Attachment 4

PROFORMA FOR FINANCIAL CAPABILITY OF BIDDER
(for a period of last three years)

Bid No. _____Package Code_____Date of Opening _____
Time_____
Name of the Bidder_____

Year	Currency	Turnover
Annual Balance sheet for last two years may be furnished		

Note:

1 The annual turn over amount is to be supported by annual report.

Signature of the Authorized Representative

Name of the Person

Position

Attachment 5

<Letterhead of the Bidder>

CERTIFICATE OF O&M PARTNER OF THE BIDDER IN INDIA

To :

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Subject: Certificate of Existence of Local Branch, Sales Residential and Representative Office(s) in India

1. Name of Office (s) :
2. Address :
   Tel. No. :
   Fax No. :
   Telex No. :
   Email id. :

3. Status of Office(s) :

4. Date of Establishment of Office(s) :

5. Name & Address of Residential Representative :

6. Total No. of years of association with OEM (Name of the manufacturer):

7. Total Manpower

8. Total No. of Trained Service Engineer:

9. Present No. of offices in India (Name the locations & address):

10. Total Turnover in last 3 years:

11. Major Job in Hand:

12. Experience in O&M contract:

Sl. No.	Name of Client and Address, Phone No. etc.	Description of Contract (Brief scope of contract)	Year of Placement of Order	Present Status

Signature
Name:
Designation:

Seal:

Attachment 6

<Letterhead of the Manufacturer>

FORM OF CERTIFICATE OF COUNTRY OF ORIGIN

To

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Name of Manufacturer

Subject: Certificate of Country of Origin

We, (Name of Manufacturer), hereby certify that our equipment for procurement and installation of equipment for TNPCB laboratories in the State of India is to be manufactured in the country mentioned below:

Item No.	Name of Equipment	Country of Origin

Signature
Name of Person
Title

Name of Manufacturer
Legal Address

Countersign of competent authority of the country of origin.

Attachment 7

FORM OF EQUIPMENT LIST OFFERED

Item No.	Name of Equipment	Proposed Model	Manufacturer	Country of Origin Address Tel. Fax Nos. and Email-Id	Technical Catalogue Attached (Yes / No)

Signature of the Authorized Representative

Name of the Person

Position

Attachment 8

<Letterhead of the Manufacturer>

FORM OF CERTIFICATE OF SUPPLY OF SPARES AND CONSUMABLES BY MANUFACTURER

Date ;

To

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Sub. : Certificate of Supply of Consumables and Spare Parts by Manufacturer

This is to certify that we (Name of Manufacturer) shall supply the consumables and spare parts of the equipment mentioned below during O&M period under the contract (contract detail) to the contractor (Name of the contractor)/Owner.

It is hereby guaranteed that we shall maintain stocks of consumables and spare parts for the following equipment for a period of Ten (10) years after the commissioning of the equipment in India.

Item No.	Name of Equipment	Name of Manufacturer

Signature:

Name of Person:

Position:

Name of Manufacturer:

Office Seal of Manufacturer:

Legal Address of Manufacturer:

Attachment 9

PRE-REQUISITES FOR INSTALLATION OF EQUIPMENT

To,

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Dear Sir,

Following are the pre-requisites for installations of the equipment offered by us, which are required to be provided by you prior to installation of the equipment:

Package no. / Item No.	Name of the Equipment	Installation & commissioning pre-requisites*

*** Requirements of Power supply (KW / KVA etc.), power backup, air conditioning, hooding, space, furniture, gas supply etc. to be mentioned by the bidder.**

Signature of the Authorized Representative

Name of the Person

Position

Note:
Continuation sheets, of like size and format, may be used as per Bidder's requirement and shall be annexed to this Schedule.

SECTION - V

TERMS AND CONDITIONS FOR OPERATION AND MAINTENANCE

TERMS & CONDITIONS FOR OPERATION AND MAINTENANCE CONTRACT

1. The bidder should furnish the information on all past supplies and satisfactory performance, in "Performance Statement" as per Attachment No. one and minimum two (2) no. documentary evidences (client certificates in favour of bidder or manufacturers of equipment) in support of the satisfactory operation of similar air monitoring stations, which is in use for last two (2) years in case bidder is manufacturer or for last one (1) year in case bidder is authorized representative.

2. The bidders should have the adequate at least 10 years at AQ monitoring experience with proven track record. The O & M partner should have enough experience/capability to validate and interpret the AQ data obtained from the CAAQMS.

3. In case the bidder associates with an O&M partner in India, then its O&M partner (any authorized agency in India) should have well trained O&M personnel and proven track record in the field of service maintenance of CAAQMS with the client's certificate for satisfactory performance.

4. The O&M partner shall furnish an undertaking regarding carrying out satisfactory O&M of CAAQMS covered in this document as per terms & conditions of the document on behalf of the bidder. This information is to be provided in check list -B as per Attachment 2 & 3 to be enclosed in Cover - A.

5. In case the bidder intends to carry out O&M activity on his own, then it should have well trained O&M personnel on its regular rolls as mention above. To establish this bidder should enclose the curriculum vitae above persons with required experience.

6. <u>DETAILS OF PROJECT STRUCTURE</u>

Successful Bidder would be awarded the project under a Supply and Service Agreement, which would entail supply, installation and Commissioning of 1 set of CAAQMS Equipments at selected site.

Operation and Maintenance of the CAAQMS Equipment for a period initially for 5 years from the date of its commissioning and likely to be extended for 3 more years.

Daily reporting of data pertaining to Ambient Air Quality to TNPCB.

TNPCB would make a upfront payment for AAQMS equipment, on Supply, Installation and Commissioning of the systems. TNPCB would procure the AAQMS

equipment on its name. TNPCB would make regular payments for the supply of Data at the end of each Quarter. The bidders therefore need to quote two prices viz. for Supply Installation and Commissioning of the Systems and for reporting of data to TNPCB. The price for the data supply would include the Operation and Maintenance cost.

TNPCB would provide building free from all encumbrances for installation of monitoring stations free of cost. Along with the building, TNPCB would provide basic amenities like approach, telephone and electricity connections at the proposed location. TNPCB would bear the initial installation cost for these facilities and the monthly/recurring cost pertaining to their usage (monthly telephone and electricity bill) would be borne by the Successful Bidder.

One No. of Day light & Night visible data display system are to be supplied, installed at the site of CAAQMS and maintained initially for five years and likely to be extended for three more years. All Day light & Night visible data display systems are to be integrated to respective CAAQM Stations. TNPCB would identify location for installation of Day light & Night visible data display system and same would be handed over to the successful bidder free of cost. TNPCB would provide telephone and electricity connections at the identified locations. . However all other installation requirement for Display System are to be arranged by the successful bidder and cost for same should be included in bid price.

7. SCOPE OF SERVICES

The equipments are to be quoted as single package. The Scope of Works under the package shall include:

A) The supply, installation, testing and commissioning of equipment and provision of training of TNPCB official.

B) Operation & Maintenance of Air Monitoring Stations initially for five years from the date of commissioning of the station and likely to be extended for three more years at the mutually agreed rates and terms & conditions.

C) Reporting of data pertaining to CAAQMS to TNPCB &CPCB.

D) On line transfer of data to TNPCB head office &CPCB.

Other services involved with performance of the Works are specified in General and Special Conditions of Contract of bid document

8. DATA MANAGEMENT AND QUALITY CHECKS

Data shall be collected and validated according to USEPA standards/National Ambient Air Quality Standards using the methodologies included in 40 Code of

Federal Regulations. All analyzers shall have current USEPA reference or equivalent method designation and shall be of the latest design.

9. GENERAL GUIDELINES

Working Hours: The site for AAQMS operation should be manned by the employees of the Successful Bidder for 24 hours a day. In addition the Successful Bidder would arrange for a security of the site and equipments through appointment for security agency (providing at least one security guards) throughout the day.

Insurance: Successful Bidder would bear the cost of insuring the equipment and facilities against any theft, fire and other applicable provisions during tenure of contract period including O&M.

10. INSPECTION AND TEST

Unpacking Inspection

The Contractor shall inspect at each Site whether all the Equipment are packed in conformity with the Equipment list and packing list without any damage immediately after arrival of the Equipment at each site.

The Contractor shall prepare the unpacking inspection report and submit it to the TNPCB.

Performance Test

The Contractor shall carry out the performance test for all the Equipment supplied under the scope of work of this document.

In case the Equipment for performance test requires the supplemental and /or supporting Equipment, the Contractor shall carry out the performance test including such Equipment.

11. PROVISION OF TRAINING

The Supplier shall provide the training to the Board staff after the performance test and commissioning. Training should include but not limit to the followings:

1) Inspection of the Equipment.
2) Precautions in use of the Equipment.
3) Basic measurement principle.
4) Principles of operation of the Equipment.
5) Start-up and shutdown procedure.
6) Operation of the Equipment.
7) Calibration method.

8) QA/QC
9) Data management and software application.
10) Safety precautions
11) Basic maintenance procedure.
12) “Do’s” and “Don’ts” in operation of the Equipment.
13) Handling of hazardous chemicals and gas.
14) Others, which are deemed to be necessary by the Supplier.

In case the Equipment for training requires the supplemental and/or supporting Equipment, the Supplier shall carry out the training including such Equipment.

The Supplier shall discuss and finalize the detailed contents and schedule of the training program in consultation with the Board during installation of the Equipment.

The Supplier shall furnish the training manual and/or CD as required for training for all the Equipment supplied under the scope of work of this document.

Contents of training manual and/or CD for the Equipment are as follows:

1. Principle of the Equipment.
1. Operation and calibration of the Equipment.
2. Maintenance and basic repair of the Equipment.
3. Safety instruction of the Equipment.
4. Others, which are deemed to be necessary by the Supplier.

12. **Operation & maintenance of Air Monitoring Stations:**

The Contractor’s responsibilities shall include without limitations the following works to be carried out on the Air Monitoring Station installed under this Contract during the Operation & Maintenance of the stations:

a) Operation and Maintenance of all the commissioned equipments and amenities as supplied by the Manufacturer under the Contract including services during forced and planned outages and overhauls.

b) The Contractor shall take over the entire Air Monitoring Station (including all equipment) for O&M after execution of Indemnity Bond as per format enclosed (refer Section III Page No.23 &24).

c) The Contractor shall provide to the TNPC Board a monthly summary of all operation and maintenance activities performed by the contractor during such month.

d) Operation and Maintenance Obligations:

In implementing its obligations to operate and maintain the Facility under this Contract, the Contractor shall:

i) Undertake comprehensive maintenance including i.e., schedule and

breakdown maintenance &repair at site and keep Board Informed regarding status of equipments and forward daily data as per Information Report Format (F).

ii) Obtain permission from the TNPC Board and inform the OEM for any assistance for which equipment is required to be sent to works. Contractor shall arrange substitute equipment to keep CAAQM station operational.

iii) Take reasonable action to assure that the Personnel deployed at Air Monitoring Stations and any subcontractors and agents are provided with place in a work compliance with applicable Law.

iv) Keep the Air Monitoring Stations clean, well maintained and in good working condition.

v) Security: It is the duty of the Contractor to secure the movable, immovable and other properties of the TNPC Board at the Air Monitoring Stations. The Contractor shall indemnify the loss caused to the TNPC Board on account of any damage, loss or theft caused to the property of the TNPC Board.

vi) Scheduled Maintenance: Unless TNPC Board and Contractor mutually agree otherwise, perform all required Scheduled Maintenance for all equipment, auxiliaries etc., in accordance with the O&M's specifications.

vii) Unscheduled Maintenance: Perform all Unscheduled Maintenance and repairs for all equipment, auxiliaries etc. within [24] hours of the occurrence of the event requiring Unscheduled Maintenance, the operator shall provide the TNPC Board with detailed written information on nature of the repair or replacement to be carried out, estimated down time and other necessary details as required.

viii) The Contractor shall source all the spares required for maintenance & repairs of the installed equipment from OEM's only.

e) The Operator shall not:

i. Make any modifications as to the Air Monitoring Stations, other than in an Emergency, without the prior written approval of the TNPC Board, or

ii. Dispose off any assets, settle law-suits or engage in transactions relating thereto on the TNPC Board's behalf without the prior written approval of the TNPC Board.

f) The Contractor shall purchase spare parts, materials, supplies and other consumable items, and maintain an inventory thereof, for the Air Monitoring Stations. All such

material supplied and other items shall be the property of the Contractor, however all the spares shall be sourced from OEM's only.

g) The Contractor shall review all applicable Laws and initiate and maintain such precaution, procedures and operating plans relating to operation of the Air Monitoring Stations as are necessary to comply therewith or assist the TNPC Board in complying therewith as the case may be.

h) The Contractor shall operate the equipment as per the laid out standards in the operating manual of the equipment and providing data for ambient air to TNPCB on daily basis in the suggested format. The daily monthly and yearly Reporting Formats are attached(Information Report Format (A to F).

i) The AAQMS has to be in operation for a minimum of 85% days in a year, 24 hours a day, and should not be non functional for more than 7 days at a stretch.

j) Provide data collected through operation of the equipments on daily basis in suggested output formats given in the bid document.

i. Establish and maintain a daily and monthly reporting system to provide storage and ready retrieval of operation and maintenance data including such information necessary to verify calculations. The monthly reporting shall contain variances from targets.
ii. provide access to the TNPC Board to the Air Monitoring Station and its data at all reasonable times.
iii. Provide the operational data required to all competent authorities including, Government of India or concerned State Governments.
iv. On line transfer of data to TNPCB head office at Chennai/CPCB web site.

k) The Contractor shall ensure accuracy of the data provided as per standards.

I) The contractor shall ensure periodic re-calibration of all the equipment as per manufacturer's instructions and maintain "Protocol Manual Calibration" as per Information Report Format F.

13. TNPC Board shall arrange for the following and Contractor shall guide and assist the TNPC Board:

a) The TNPC Board shall pay O&M charges at the end of each quarter to the Contractor after submission of validated data & report by the Contractor, in accordance with the payment terms detailed in Special Conditions of Contract.

b) TNPC Board shall pay all fees including Service Tax, real property taxes, cess etc., imposed upon TNPC Board by the Applicable Law.

c) The TNPC Board shall identify and hand over the site for erection & commissioning of Air Monitoring Stations free from all encumbrances.

d) The TNPC Board shall make the arrangement for electricity & telephone connection at the site. However monthly charges for both electricity and phone bill shall be borne by the Contractor.

e) The valid data capture rate should be minimum 85%. The full payment shall only be made if validated data is 85% and all the calibration protocol maintenance scheduled and spare parts/ consumable replacement document are maintained and verified by the TNPC Board. The contractor has to maintain records / Receipts/ bills paid available as and when required.

14. Handing Over of Stations:

On expiry/closure/termination of the Contract Agreement, stations shall be handed over to Board in working condition to the satisfaction of Board. Few or all the spares procured by the Contractor and unused as on date of handing over may be purchased by the TNPC Board at his discretion provided Contractor is able to provide reasonability of the costs of such spares. In addition the Contractor shall provide consumables equivalent to three months consumption on expiry/closure/termination of the Contract Agreement without any extra financial implication.

15. Relocation of Station:

During contract period, if Board intends to shift CAAQM station from one location of the city to another location, due to some reason – functional or otherwise, Bidder shall shift the CAAQM station for which cost of shifting including dismantling, loading & transportation, reinstallation at new location and construction of foundation will be made by the Board at a mutual agreed cost.

16. Penalties:

During O&M period, in case of any system failure, penalty will be charged by TNPCB @ Rs.1,000/- per day per Analyzer after a grace period of seven (7) continuous non-working days. The grace period of seven (7) continuous non-working days shall be given only once per quarter (3 months).

For a failure of total display panel, a penalty will be charged by TNPCB @ Rs.1,000/- per day after a grace period of seven (7) continuous non-working days.

The grace period of seven (7) continuous non-working days shall be given only once per quarter (3 months).

Failure due to power outage and other Force Majeure conditions shall not be considered for levy of penalty.

Total penalty per year during O&M period on account of above conditions shall be limited to 15% of total O&M charges for one year. Failing which defective/ malfunctioning analyser / system has to be replaced.

In case penalty in the year exceeds 15% as above, the Contractor shall be required to replace the defective analyzer (s) or systems with new ones at his own cost, failing which the TNPCB shall have the right to terminate the O&M contract.

Check List - B

FOR OPERATION & MAINTENANCE

Sl.No.		Page No.	YES	NO
1	Certificate of carrying out O&M of CAAQM by the O&M partner in India			
2	Capability & experience of O&M partner			
3	Information Report Formats (A)			
	Format (B)			
	Format (C)			
	Format (D)			
	Format (E)			
	Format (F)			

O & M attachment - 1

<Letterhead of the O&M Partner>

FORM OF CERTIFICATE OF CARRYING OUT O&M OF CAAQMS's BY THE O&M PARTNER IN INDIA

Date ;

To

Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai - 600 032.

Sub. : Certificate of carrying out O&M of CAAQMS by the O&M partner in India.

This is to certify that we <Name of O&M Partner> hereby agree to carry out day to day Operation and maintenance of the CAAQMS installed and commissioned by <Name of the main bidder> for minimum of five years from the date of installation & commissioning of the CAAQMS at the rates quoted by <Name of the main bidder> against this tender, strictly in accordance with terms & conditions contained in this bid document.

Signature:
Name of Person:
Position:
Name of O&M Partner:
Office Seal of O&M Partner:
Legal Address of O&M Partner in India:

Counter-signed by main bidder
Name of Person:
Position:
Name of the Bidder:
Office Seal of Bidder:
Legal Address of Bidder

O & M attachment - 2

CAPABILITY & EXPERIENCE OF O&M PARTNER

Name and address of the O&M Partner in India (if applicable):
(Not required in case of Bidder proposing to carry out O&M himself)

Sl. No.	Name of the O&M personnel proposed to be deployed	Educational Qualification	Experience in no. of years in carrying out O&M of CAAQMS.	Detail curriculum Vitae Attached (YES / NO)
1.				
2.				

Signature of the Authorized Representative

Name of the Person

Position

INFORMATION REPORT FORMATS

Information Report Format (A)

MONTHLY FIELD CHECK LIST OF (To be filled by TNPCB officials deputed)
CAAQM STATION UNDER OPERATION CONTRACT ------(name of the city)

S. No.	Description	----------(name of the Station) Station	Remarks
1.	Station Visit Date		
	(i) 1st Week		
	(ii) 2nd Week		
	(iii) 3rd Week		
	(iv) 4th Week		
2.	SOP Available at Station		
3.	Environmental Condition of Station		
4.	Protocol of Station available		
5.	Availability of Calibration Gas		
6.	Availability of Permeation Tube (NIST Traceable)		
7.	Bi Weekly Calibration Done (Precision check, two point calibration check)		
8.	Full Calibration Done (Multipoint Calibration check)		
9.	Insurance Validity		
10.	Electricity Bill Paid, if any		
11.	Telephone Bill Paid, if any		
12.	Security Guard Payment, if any		
13.	Servicing of ACs Installed, if any		
14.	Data Display Board Working		

15.	O&M Rate - Cheque payment, if any		
16.	Name of the Company Engineer Deputed/Present		
17.	Data Analyst at Central Station Deputed/Present		
18.	Log-Book maintained and observation entered.		
19.	Date Received (Daily / Monthly)		
20.	Name of the visiting Official of TNPCB		
21.	Special Remarks, if any		

……
Signature of TNPCB official

Information Report Format (B)

Tamilnadu Pollution Control Board
Continuous Ambient Air Quality Monitoring Report (MAIN POLLUTANTS)
To be submitted daily at 06 morning for that day ending at next 06 morning
DAILY AMBIENT AIR QUALITY DATA

Station Name:----------
Report No. :
Monitoring Location :
Data Interval: 1 Hr. Average
Monitoring Conducted By:----------

Month:----------
Date:----------.

Hrs.	NO	NO_2	NO_X	NH_3	SO_2	CO	O_3	$PM_{2.5}$	PM_{10}	Benzene	Toluene	Ethyl Ben	MP Xylene	O xylene
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
06-07Hr.														
07-08 Hr.														
08-09 Hr.														
09-10 Hr.														
10-11 Hr.														
11-12 Hr.														
12-13 Hr.														
13-14 Hr.														
14-15 Hr.														
15-16 Hr.														
16-17Hr.														
17-18 Hr.														
18-19 Hr.														
19-20 Hr.														

20-21 Hr.														
21-22 Hr.														
22-23 Hr.														
23-00 Hr.														
00-01 Hr.														
01-02Hr.														
02-03 Hr.														
03-04Hr.														
04-05 Hr.														
05-06 Hr.														
MINIMUM														
MAXIMUM														
AVERAGE														
Data Captured														
Note :														

Information Report Format (C)

Tamilnadu Pollution Control Board
Continuous Ambient Air Quality Monitoring Report (Mean Concentration of Main Pollutants)

Monitoring Location: ……..
Year ……..

Months	NO	NO_2	NO_X	NH_3	SO_2	CO	O_3	$PM_{2.5}$	PM_{10}	Benzene	Toluene	Ethyl Ben	MP Xylene	O xylene
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
January														
February														
March														
April														
May														
June														
July														
August														
September														
October														
November														
December														
MINIMUM														
MAXIMUM														
AVERAGE														

Information Report Format (D)

Tamilnadu Pollution Control Board

MONTHLY REPORTING FORMAT FOR METREOLOGICAL PARAMETERS

(To be submitted monthly next day ending month)

Location: **Month:**

DATE	WIND SPEED	WIND DIRECTION	VERTICAL WIND SPEED	HUMIDITY	TEMPERATURE	SOLAR RADIATION	PRESSURE	REMARKS
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DATE	WIND SPEED	WIND DIRECTION	VERTICAL WIND SPEED	HUMIDITY	TEMPERATURE	SOLAR RADIATION	PRESSURE	REMARKS
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Min		----						
Max		----						
Average		Pre dominant direction						

Signature of the Authorized Representative
Name of the Person
Position

Information Report Format (E)

Calculation of City-wise Payment for O & M Charges on Quarterly Basis for CAAQM Stations under O & M Contract

Bill raised for O & M Charges by M/s …… Invoice No. …… Date ……							‘
Total Amount							‘
Name of the Station →		**STATION I (Location …….)**		**STATION II (Location .....)**		**STATION III (Location…….)**	
Quarter No.: →							
Duration: →							
Year:→							
Percentage of valid monthly data captured rate →	Month 1						
	Month 2						
	Month 3						
Average Quarterly Data Captured Rate→							
		Price for service portion	Price for material part & other incidental charges	Price for service portion	Price for material part & other incidental charges	Price for service portion	Price for material part & other incidental charges
Base Amount per Quarter (as per NoA)**(A)**							
Proportionate Amount based on Valid Data Captured Rate**(B)** Formula: see at footnote*							
Applicable Deduction as per penalty provision for continuous non-functioning**(C)**							
Any Other Deduction, specify with justification**(D)**							
Applicable Taxes &Duties**(E)** - Service Tax - Education Cess - Secondary &Higher Education Cess - CST							
Net Amount Payable (‘)**[F = B- (C+D) +E]**							
Total O&M cost Payable(Station Wise)		**(i)**		**(ii)**		**(iii)**	
Total Amount Payable (‘) for O& M cost for City for quarter no. 1/2/3/4 of year ----- (I + ii + iii)							

* **Percentage quarterly data captured rate/ 85% X A**

Information Report Format (F)

STATION PROTOCOL FOR CAAQM STATION UNDER O&M CONTRACT

NAME OF CAAQM STATION

DATE:

S. No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	*Post*	*Pre*	*Post*	Span Source	*Pre*	*Post*	*Pre*	*Post*	
1.	**CO** Analyzer											
2.	**SO_2** Analyzer											
3.	**NO_x** Analyzer											
	NO											
	NO_2											
	NOx											
	NH_3											
4.	**O_3** Analyzer											
5.	**BTX** Analyzer											
	Benzene											
	Toluene											
	E-benzene											
	M+P Xylene											
	O-Xylene											
6.	**Dust** Analyzer											
	$PM_{2.5}$											
	PM_{10}											
7.	**Meteorological Parameter**											
	Temperature											
	Humidity											
	Wind Speed											
	Wind Direction											
	Solar Radiation											
	Rain Fall											
8.	**Computers**											
9.	**UPS / ACs / Others**											
10.	**Data Display Board**											
	Maintenance Details/ Requirement											
	1.											
	Specific Observation(s)											

Station Maintained By…… Station supervised by ……

SECTION - VI

ATTACHMENT FOR PRICE BID

(To be enclosed in **Cover - B**)

Check List - C

Sl.No.		Page No.	YES	NO
1	Summary of price bid (Attachment 10)			
2	Bid price break up for equipment(Attachment 11)			
3	Bid price break up for O & M for 5 years (Attachment 12)			
4	Annual report and Balance Sheet for the Last 2 years			

Attachment 10

SUMMARY OF PRICE BID

DESCRIPTION	**TOTAL VALUE**
I. SUPPLY OF THE EQUIPMENT	
1) For goods supplied from abroad (In Bid-Currency) a. FOB price for Package b Freight c Insurance up to port of de-embarkment	
CIF Price at port of de-embarkment (bid currency) (1a + 1b + 1c)	
2) Local Costs for goods supplied from abroad a. Port handling and clearance charges. b Transportation cost from Port of de-embarkment to Sites c. Insurance from Port of de-embarkment up to handing over Installation and commissioning	
Sub total (2a + 2b + 2c)	
3) For the Goods Supplied from India a. The price of the Equipment quoted ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the Equipment quoted ex-works or ex-factory. Price for handling and inland transportation, insurance up to handing over the equipment at Site and other local costs up to delivery of the Equipment to each Site. b Installation and commissioning c Price of other incidental cost, if any, then the Bidder shall specify the same.	
Sub total (3a + 3b + 3c)	
TOTAL FOR SUPPLY (1 + 2 + 3)	
II Total O&M cost for five years CAAQMS's as indicated in Attachment 12	
GRAND TOTAL CONTRACT PRICE (BID CURRENCY/INR) **(I + II)**	
:	

NOTE: 1. ALL LOCAL TAXES, DUTIES & LEVIES ARE PAYABLE AT ACTUAL (EXTRA) BY THE OWNER.

2. SERVICE TAX SHALL BE PAYABLE ONLY ON THE SERVICE PORTION OF O&M COST ONLY (EXCLUDING SUPPLY OF SPARES FOR MAINTENANCE & OVERHAULING) AS **INDICATED IN Attacment-12**

Attachment 11

(1) BID PRICE BREAKUP FOR EQUIPMENT (CIF) PRICE

Sl. No.	Items	Manufacturer	Country of Origin	Model	Quantity in Nos. / Sets	Unit Price (BID CURRENCY)	TOTAL Price (BID CURRENCY)
1	Air Conditioner Split Type, along with voltage stabilizer.						
2	On line 10 KVA UPS						
3	On line 5 KVA UPS						
3	Sampling System having 10 port manifold						
4	19” Rack cabinet to accommodate all analyzers						
5	Ambient Oxides of Nitrogen (NO/NO_2 / NO_x /NH3) Analyzer						
6	Ambient Sulphur Dioxide (SO_2) Analyzer						
7	Multi calibration System for Gas calibration and Meteorological, Flow and Electronic Calibration						

Sl. No.	Items	Manufacturer	Country of Origin	Model	Quantity in Nos. / Sets	Unit Price (BID CURRENCY)	TOTAL Price (BID CURRENCY)
8	PM_{10} MONITOR						
9	$PM_{2.5}$ MONITOR						
10	Meteorological Sensors for Wind Direction, Wind Speed, Vertical Wind Speed, Ambient Temperature, Relative Humidity, Solar Radiation, Rainfall monitor & Barometric Pressure and Telescoping Crank – up Meteorological Tower						
11	DAS systems consisting of two (2)PC along with two(2)Laser colour Printers DAS for monitoring station and at Central Office at Chennai with peripherals and software for data acquisition/display/ transfer and systems integration.						
12	Day light & Night visible						

Sl. No.	Items	Manufacturer	Country of Origin	Model	Quantity in Nos. / Sets	Unit Price (BID CURRENCY)	TOTAL Price (BID CURRENCY)
	data display system						
13	ADSL Modems						

*** Items** other than the above mentioned may be quoted in Indian currencies each meteorological sensor to be quoted.

** The break up for price bid for local components with total an imported items with total may be furnished separately. This may involve regrouping of the 1 – 13 items listed above.

Attachment 12

BID PRICE BREAKUP FOR O&M OF CAAQMS'S FOR FIVE YEAR

Sl. No.	Year of O&M	Service charges for O&M in Rs.	Cost of material including spares & consumables for Operation & maintenance and other incidental expenses i.e. electricity, and telephone & Insurance charges in Rs.	Total Charges for the year in Rs.
		Unit rate for one station	**Unit rate for one station**	**Unit rate for one station**
1.	1st year			
2.	2nd Year			
3.	3rd Year			
4.	4th Year			
5.	5th Year			
TOTAL				

NOTE:

A. SERVICE TAX SHALL BE PAYABLE ONLY ON THE SERVICE PORTION OF O&M COST ONLY (EXCLUDING SUPPLY OF SPARES FOR MAINTENANCE & OVERHAULING).

B. COST OF MATERIAL INCLUDING SPARES & CONSUMABLES FOR OPERATION & MAINTENANCE SHALL BE INCLUSIVE OF ALL TAXES & DUTIES.

Signature of the Authorized Representative

Name of the Person

Position

Attachement-13

O&M Costs

Sl.No.	Description	Monthly Cost	Annual cost
1	Man Power 1. Diploma/Degree in electronics 2. Graduate in Science		
2	Annual Maintenance Control		
	AMC for A/C Machines		
	AMC for UPS maintenance		
	Security Service –3 shift		
	House Keeping		
3	Services & Utilities		
	Broad band / Internet		
	Telephone (Staff & System use) (including / Phone /Modem for Display Board)		
	Electricity charges with Rate per unit		
	Service Tax if any		
	TOTAL		

Note: Cost should be filled up in the above format.

(to be enclosed in **Cover - B**)

ANNEXURE – IV

SPECIAL CONDITIONS OF TENDER FOR THE SUPPLY, INSTALLATION, COMMISSIONING AND OPERATION & MAINTENANCE SERVICES FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS (CAAQMS).

1. **INSTALLATION**

   The rates quoted shall be inclusive of free delivery at the locations indicated by Tamilnadu Pollution Control Board. The system shall be installed and brought into complete operation, at a chosen location and to the complete satisfaction, without any additional charges whatsoever.

2. **PAYMENT**

   Payment will be made through Letter of Credit for all imports against documents. For local supply payment will be made within 30 days after proper certification of bills by the officer in charge.

3. **WARRANTY**

   (i) Comprehensive warranty for a minimum period of 5 years shall be given from the date of commissioning; and

   (ii) Service back up including commitment for the availability of the spares of the system for a minimum period of 10 years from the date of installation should be ensured. Also in case of equipment going out of production, at least 3 years advance notice should be given to enable, one time procurement of spares.

4. **DELIVERY**

   The instrument should be supplied within 90 days from the date of confirmed order.

5. **DELAY**

   Any delay in the installation and commissioning of the equipment shall be the responsibility of the suppliers.

6. **VALIDITY**

   The rates quoted shall be valid for a minimum period of **180 days from the date of opening of the Price bid of the Tender.**

7. **TRAINING**

   Training should be provided at least for two persons in the operation and maintenance of the entire system at the installation site.

Place: Signature with seal / Address

Date: